ORDER NO. DMD980905424

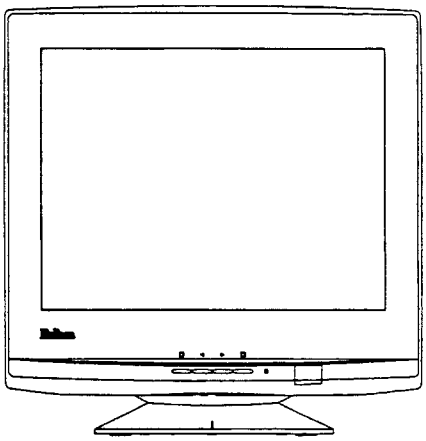
Service Manual

Multi-Scan Color CRT Display

MODEL 106070 (M-9S54XD-E)

Chassis No. HV10H

Chassis Family No.19HV10H



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⚠ WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public.

It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product.

Products powered by electricity should be serviced or repaired only by experienced professional technicians.

Any attempt to service or repair the product or products dealt within this service information by anyone else could result in serious injury or death.

SAFETY PRECAUTIONS

1 CAUTION:

No modification of any circuit should be attempted. Service work should only be performed after you are thoroughly familiar with all of the following safety checks and servicing guide lines.

2 SAFETY CHECK

Care should be taken while servicing this CRT display because of the high voltage used in the deflection circuits. These voltages are exposed in such areas as the associated flyback and yoke circuits.

3 FIRE & SHOCK HAZARD

3-1 Insert an isolation transformer between the CRT display and AC power line before servicing the chassis.

3-2 In servicing pay attention to original lead dress especially in the high voltage circuit. If a short circuit is found, replace all parts which have been overheated as a result of the short circuit.

3-3 All the protective devices must be reinstalled per original design.

3-4 Soldering must be inspected for possible cold solder joints, frayed leads, damaged insulation, solder splashes or sharp solder points. Be certain to remove all foreign material.

4 LEAKAGE CURRENT COLD CHECK

4-1 Unplug the AC cord and connect a jumper between the two prongs on the plug.

4-2 Turn the CRT display power switch "on" .

4-3 Measure the resistance value with an ohmmeter between the jumpered AC plug and each exposed metallic part on the CRT display such as the metal frame, screwheads, control shafts, etc. When the exposed metallic part has a return path to the chassis, the reading should be 1.8 megohm minimum.

5 LEAKAGE CURRENT HOT CHECK

5-1 Plug the AC cord directly into the AC outlet. Do not use an isolation transformer during this check.

5-2 Connect a 1500 ohm, 10 watt resistor, paralleled by a 0.15μF capacitor between each exposed metallic part and a good earth ground (as shown in Fig.1).

5-3 Use an AC voltmeter with 1000 ohm/volt or more sensitivity and measure the AC voltage across the combination 1500 ohm resistor and 0.15μF capacitor.

5-4 Move the resistor connection to each exposed metallic part and measure the voltage.

5-5 Reverse the polarity of the AC plug in the AC outlet and repeat the above measurement.

5-6 Voltage measured must not exceed 7.5 volt RMS, from any exposed metallic part to ground A leakage current tester may be used in the above hot check, in which case any current measured must not exceed 5.0 milliamp. In the case of a measurement exceeding the 5.0 milliamp value, a rework is required to eliminate the chance of a shock hazard.

Note: High voltage is present when this CRT display is operating. Always discharge the anode of the picture tube to the display chassis to prevent shock hazard.

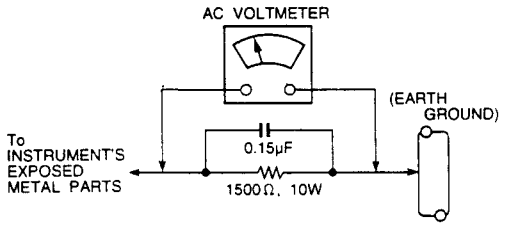


Fig.1

6 IMPLOSION PROTECTION

Picture tubes are equipped with an integral implosion protection system, but care should be taken to avoid damage and scratching during installation. Use only Panasonic replacement picture tubes.

7 X-RADIATION

WARNING : The only potential source of X-Radiation is the picture tube. However when the high voltage circuitry is operating properly there is no possibility of X-Radiation problem. The basic precaution which must be exercised is to keep the high voltage at the following factory-recommended level.

Note: It is important to use an accurate periodically calibrated high voltage meter.

7-1 The procedure for adjustment high voltage is as shown on page 23.

7-2 If can not be adjust 24.5 kV at immediate service is required to prevent the possibility of premature component failure.

7-3 To prevent X-Radiation possibility it is essential to use the specified picture tube.

IMPORTANT SAFETY NOTICE

There are special components used in this CRT displays which are important for safety. These parts are identified by the international symbol ⚠ on the schematic diagram and on the replacement parts list. It is essential that these critical parts should be replaced with manufacture's specified parts to prevent X-RADIATION, shock, fire or other hazards. Do not modify the original design or this will void the original parts and labor guarantee.

GENERAL INFORMATION

1. OUTLINE

TX-D9S54 series are 19inch (18.0" viewable) short length multi-scan color CRT display with excellent features as following.
I²C based micro processor & enhanced OSD are newly introduced to optimize the performance.

2. FEATURES

2-1 SSP-Lite LSI (Advanced Super Signal Processor) mounted

Precise wave forms are generated for the correction of each geometric distortion.

2-2 Power Saving

Built-in Power Saving function based on VESA-DPM S standard.

Power energy shall be saved by controlling the circuit in accordance with power saving signaling from computer.

2-3 OSD (on screen display) function

OSD(5 Languages & multi location)function is new and excellent man-machine interface.

Anyone may be able to set the image as he/she likes through icon & four keys in front bezel.

2-4 Self Test function

Self Testing picture comes out by pushing any key in the case of no-connection with computer or power saving operation.

This function shows whether monitor is alive or not and can be used for self aging.

2-5 Ergonomic design

- Low emission design to meet MPR II & TCO'92
- ESF (Electrostatic field) free coating on CRT
- Tilt & swivel stand is mounted

2-6 Multi scan with digital technology

8 bit micro computer controls each circuit operation to meet with wide range signal of f_H=30~95 kHz and f_V=50~180 Hz.

So VGA, SVGA, XGA(1024x768), SXGA (1280x1024) and UXGA (1600x1200) are applicable.

2-7 1 Factory preset (+7 Reservation), 13 user memories.

- 1 standard mode is preset at the factory.
- 7 modes are stored at the factory as reservation timing.
- The memory for 13 user mode are available to set the user's own timing.

2-8 Flat Face and fine dot pitch

Flat face CRT with fine dot pitch 0.25mm gives a crisp and comfortable image.

2-9 Superior display performance

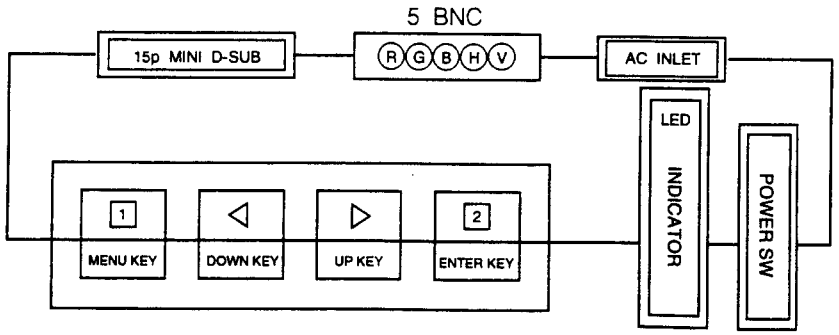
- Sharp focus entire whole screen by sophisticated gun and advanced dynamic focus circuit which optimized parabolic wave form ideally.
- Excellent contrast by Dark Tint glass and Crystal Pigment coated phoshor.
- Minimized distortion by digital correction circuit
- Full scan image capability for graphics users (refer to Item 7.4)

2-10 Special function

- VESA DDC1/2B (Display Data Channel) compatible
- Rotation control circuit
- Multi color:9300k, 7500k & 6500k & 9300k + 8 are preset at the factory
- MOIRE Reduction circuit

SPECIFICATION

3. DIAGRAM



3.1 POWER SW, LED, 1-key (MENU), ◁-key (DOWN), ▷-key (UP), and 2-key (ENTER) are located on the front panel.

3.2 Signal connectors and AC inlet are located on the back side of the cabinet.

3.3 OSD menu

CONTRAST	BRIGHTNESS	SIZE & POSITION
GEOMETRY	ROTATION	COLOR SELECT
RECALL	VIDEO INPUT LEVEL	H.MOIRE
V.MOIRE	LANGUAGE	OSD POSITION
DEGAUSS	SIGNAL	

※) CONTRAST can be directly controlled with ◁/▷-key.

※) With sync signal, OSD menu appears by pushing 1-key

With sync signal,input signal information appears by pushing 2-key.

Without sync signal, self test menu appears by pushing any key.

※) SIZE & POSITION·····H.POSITION, H.SIZE, V.POSITION, V.SIZE

※) GEOMETRY·····V.PINCUSHION/ BALANCE, TRAPEZOID, PARALLELOGRAM

※) Video clamp pulse phase can be changed by simultaneously operation for 1 and 2 key.

4. MECHANICAL SPECIFICATIONS

..... refer to the attached drawing

4.1 Dimension

	Product	Pakaged
Height	454 mm (Typ.)	561 mm (Typ.)
Width	448 mm (Typ.)	565 mm (Typ.)
Depth	415 mm (Typ.)	535 mm (Typ.)

4.2 Weight

Product weight 21.5 Kg (Typ.)

Packaged weight 25.0 Kg (Typ.)

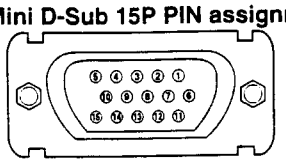
2.3 Maximum Viewable Phosphor Display Area:
: 365.6 x 274.2 mm (min.)

5. CONNECTORS

3.1 Signal connector:

Mini D-Sub 15P and BNC (R. G. B. H. V)

<15P Mini D-Sub 15P PIN assignment>



1 ... RED	6 ... GROUND	11 ... GROUND
2 ... GREEN	7 ... GROUND	12 ... SDA (DDC)
3 ... BLUE	8 ... GROUND	13 ... H. SYNC.
4 ... GROUND	9 ... - (OPEN)	14 ... V. SYNC.
5 ... GROUND (DDC)	10 ... GROUND	15 ... SCL (DDC)

5.2 AC inlet: CEE 22 typed connector

6. CRT SPECIFICATIONS

Part No.		M46LNS180X
Type		19" (18.0" Viewable), 100°, Φ29.1
Electron guns		In-line gun with Double quadruple DAF
Dot Trio Pitch		0.25mm
Bulb		DARK TINT (Total Transmission = 46.0%)
Face coating		ADVANCED AGRAS COAT
Shadow Mask		Advanced Invar Mask
	Persistence	R, G, BMedium short persistence(Hi-EU RED)
Phosphor	Red	x = 0.635 typ. , y = 0.333 typ.
	Green	x = 0.285 typ. , y = 0.605 typ.
	Blue	x = 0.152 typ. , y = 0.068 typ.

7. ELECTRICAL SPECIFICATIONS

7.1 **Standard conditions** ... Except special items

Display image	Green, full "H" characters (7 x 9 dots) Video signal : 100% duty Display area : 352 mm x 264 mm
Video signal level	0.7 V p-p
Contrast, Brightness	Contrast : Max., Brightness : detent point
Ambient Temperature	20±5°C (68 ± 9°F)
Input Voltage	AC 120 V, 60 Hz or AC 220 V, 50 Hz
Terrestrial magnetism	Vertical field : northern hemisphere field 40μT Horizontal field : no field
Viewing direction	Parallel to the CRT axis
Measurements	After an initial warming up time of more than 30 minutes.
Ambient light	200±50 IX
Display mode	1280 x 1024 (91.15 kHz, 85.02Hz)

7.2 POWER

7.2.1 **Power supply** ... Commercial power source

Input voltage	AC 90 - 132 V, AC 198 - 264 V
Power frequency	50 Hz ± 3 Hz, 60 Hz ± 3 Hz
Input current	3.0 A max. (AC100 V)
Inrush current (at 20° C)	40 A op (Cold Start20℃/AC240V)
Power consumption	140 W Typ.165 W max.(AC 100V)

5.2.2 **Power Management for Power Saving** ...

Power saving system is designed based upon VESA DPMS standard (Version : 1.0)

1) Power consumption and recovery time.

*1 APM State	SIGNALS			MONITOR POWER CONSUMP-TION	RECOVERY TIME TO ON STATE	INDICATOR
	H. Sync	V. Sync	VIDEO			
ON	*3 NOR-MAL	*3 NOR-MAL	*2 ACTIVE	*4 100%	——	Green
STAND-BY	No Sync or *5 < 10 Hz	> 40 Hz	BLANK	< 15 W	< 4 sec.	Yellow
SUS-PEND	>10 kHz	No Sync or *5 < 10 Hz	BLANK	< 15 W	< 4 sec.	Yellow
OFF	No Sync or *5 < 10 Hz	No Sync or *5 < 10 Hz	BLANK	Note < 4 W	< 20sec	Yellow

** The transition time from ON state to each APM states is 5 seconds minimum.

*1 : APM : Advanced Power Management.

*2 : Measurement Condition of power consumption for ON state :
DISPLAY IMAGE : WHITE full "H" characters (7 × 9 dots).

*3 : NORMAL : See "7.4 ACCEPTABLE TIMING".

*4 : Power Consumption is measured at AC 100-240V. (Note:3w Typ. at AC 230V/50Hz)

*5 : Power saving operation is done at least less than specified value in the list.

7.3 STANDARD TIMING

- Following 1 mode is preset in the memory as standard timing at the factory and 7 modes are reserved.
- Fig-1 shows a definition of timing and signal level.
- Electrical performance is specified based on 1280×1024 mode unless otherwise mentioned.

TIMING CHART

A	Period
B	Blanking
C	Sync Width
D	Back Porch
E	Active
F	Front Potch

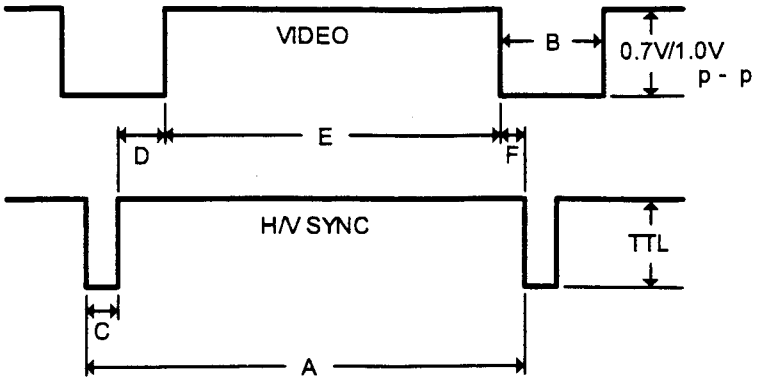


Fig.1

		PRESET	RESERVATION	RESERVATION
		MODE - 1	MODE - 2	MODE - 3
		1280 × 1024 (85)	640 × 480 (60)	800 × 600 (75)
DOT CLOCK		157.5000 MHz	25.1745 MHz	49.5000 MHz
H	f H	91.1458 kHz	31.4681 kHz	46.8750 kHz
	A - PERIOD	10.971 µs (1,728 dots)	31.778 µs (800 dots)	21.333 µs (1,056 dots)
	B - BLANKING TIME	2.844 µs (448 dots)	6.356 µs (160 dots)	5.172 µs (256 dots)
	C - SYNC WIDTH	1.016 µs (160 dots)	3.813 µs (96 dots)	1.616 µs (80 dots)
	D - BACK PORCH	1.422 µs (224 dots)	1.907 µs (48 dots)	3.232 µs (160 dots)
	E - ACTIVE TIME	8.127 µs (1,280 dots)	25.423 µs (640 dots)	16.162 µs (800 dots)
	F - FRONT PORCH	0.406 µs (64 dots)	0.636 µs (16 dots)	0.323 µs (16 dots)
V	f V	85.0241 Hz	59.9393 Hz	75.0000 Hz
	A - PERIOD	11.761 ms (1,072 lines)	16.684 ms (525 lines)	13.333 ms (625 lines)
	B - BLANKING TIME	0.527 ms (48 lines)	1.430 ms (45 lines)	0.533 ms (25 lines)
	C - SYNC WIDTH	0.033 ms (3 lines)	0.064 ms (2 lines)	0.064 ms (3 lines)
	D - BACK PORCH	0.483 ms (44 lines)	1.049 ms (33 lines)	0.448 ms (21 lines)
	E - ACTIVE TIME	11.235 ms (1,024 lines)	15.254 ms (480 lines)	12.800 ms (600 lines)
	F - FRONT PORCH	0.011 ms (1 lines)	0.318 ms (10 lines)	0.021 ms (1 lines)
SYNC POLARITY(H/V)		Positive / Positive	Negative / Negative	Positive / Positive

		RESERVATION	RESERVATION	RESERVATION
		MODE - 4	MODE - 5	MODE - 6
		1024 × 768 (75)	1152 × 864 (75)	1280 × 1024 (75)
DOT CLOCK		78.7500 MHz	108.0000 MHz	135.0000 MHz
H	f H	60.0229 kHz	67.5000 kHz	79.9763 kHz
	A - PERIOD	16.660 µs (1,312 dots)	14.815 µs (1,600 dots)	12.504 µs (1,688 dots)
	B - BLANKING TIME	3.657 µs (288 dots)	4.148 µs (448 dots)	3.022 µs (408 dots)
	C - SYNC WIDTH	1.219 µs (96 dots)	1.185 µs (128 dots)	1.067 µs (144 dots)
	D - BACK PORCH	2.235 µs (176 dots)	2.370 µs (256 dots)	1.837 µs (248 dots)
	E - ACTIVE TIME	13.003 µs (1,024 dots)	10.667 µs (1,152 dots)	9.481 µs (1,280 dots)
	F - FRONT PORCH	0.203 µs (16 dots)	0.593 µs (64 dots)	0.119 µs (16 dots)
V	f V	75.0286 Hz	75.0000 Hz	75.0247 Hz
	A - PERIOD	13.328 ms (800 lines)	13.333 ms (900 lines)	13.329 ms (1,066 lines)
	B - BLANKING TIME	0.533 ms (32 lines)	0.533 ms (36 lines)	0.525 ms (42 lines)
	C - SYNC WIDTH	0.050 ms (3 lines)	0.044 ms (3 lines)	0.038 ms (3 lines)
	D - BACK PORCH	0.466 ms (28 lines)	0.474 ms (32 lines)	0.475 ms (38 lines)
	E - ACTIVE TIME	12.795 ms (768 lines)	12.800 ms (864 lines)	12.804 ms (1,024 lines)
	F - FRONT PORCH	0.017 ms (1 lines)	0.015 ms (1 lines)	0.013 ms (1 lines)
SYNC POLARITY(H/V)		Positive / Positive	Positive / Positive	Positive / Positive

		RESERVATION	RESERVATION
		MODE - 7	MODE - 8
		1152 × 864 (85)	1600 × 1200 (75)
DOT CLOCK		121.5000 MHz	202.5000 MHz
H	f H	77.0939 kHz	93.7500 kHz
	A - PERIOD	12.971 µs (1,576 dots)	10.667 µs (2,160 dots)
	B - BLANKING TIME	3.490 µs (424 dots)	2.765 µs (560 dots)
	C - SYNC WIDTH	1.053 µs (128 dots)	0.948 µs (192 dots)
	D - BACK PORCH	1.909 µs (232 dots)	1.501 µs (304 dots)
	E - ACTIVE TIME	9.481 µs (1,152 dots)	7.901 µs (1,600 dots)
	F - FRONT PORCH	0.527 µs (64 dots)	0.316 µs (64 dots)
V	f V	84.9988 Hz	75.0000 Hz
	A - PERIOD	11.765 ms (907 lines)	13.333 ms (1,250 lines)
	B - BLANKING TIME	0.558 ms (43 lines)	0.533 ms (50 lines)
	C - SYNC WIDTH	0.039 ms (3 lines)	0.032 ms (3 lines)
	D - BACK PORCH	0.506 ms (39 lines)	0.491 ms (46 lines)
	E - ACTIVE TIME	11.207 ms (864 lines)	12.800 ms (1,200 lines)
	F - FRONT PORCH	0.013 ms (1 lines)	0.011 ms (1 lines)
SYNC POLARITY(H/V)		Positive / Positive	Positive / Positive

		ADJUSTMENT	ADJUSTMENT	ADJUSTMENT
		HV10H - 1	HV10H - 2	HV10H - 3
DOT CLOCK		22.5900 MHz	91.6240 MHz	160.6320 MHz
H	f H	29.1108 KHz	52.1777 KHz	75.2022 KHz
	A - PERIOD	34.351 µs (776 dots)	19.165 µs (1,756 dots)	13.297 µs (2,136 dots)
	B - BLANKING TIME	6.906 µs (156 dots)	4.235 µs (388 dots)	3.187 µs (512 dots)
	C - SYNC WIDTH	3.320 µs (75 dots)	1.746 µs (160 dots)	1.145 µs (184 dots)
	D - BACK PORCH	2.258 µs (51 dots)	1.768 µs (162 dots)	1.544 µs (248 dots)
	E - ACTIVE TIME	27.446 µs (620 dots)	14.931 µs (1,368 dots)	10.110 µs (1,624 dots)
	F - FRONT PORCH	1.328 µs (30 dots)	0.720 µs (66 dots)	0.498 µs (80 dots)
V	f V	47.4891 Hz	92.3499 Hz	137.2304 Hz
	A - PERIOD	21.057 ms (613 lines)	10.828 ms (565 lines)	7.287 ms (548 lines)
	B - BLANKING TIME	0.927 ms (27 lines)	0.556 ms (29 lines)	0.426 ms (32 lines)
	C - SYNC WIDTH	0.103 ms (3 lines)	0.057 ms (3 lines)	0.040 ms (3 lines)
	D - BACK PORCH	0.721 ms (21 lines)	0.479 ms (25 lines)	0.372 ms (28 lines)
	E - ACTIVE TIME	20.130 ms (586 lines)	10.273 ms (536 lines)	6.861 ms (516 lines)
	F - FRONT PORCH	0.103 ms (3 lines)	0.019 ms (1 lines)	0.013 ms (1 lines)
SYNC POLARITY(H/V)		Negative / Negative	Negative / Negative	Negative / Negative

		ADJUSTMENT
		HV10H - 4
DOT CLOCK		230.1100 MHz
H	f H	96.5227 KHz
	A - PERIOD	10.360 µs (2,384 dots)
	B - BLANKING TIME	2.694 µs (620 dots)
	C - SYNC WIDTH	0.834 µs (192 dots)
	D - BACK PORCH	1.495 µs (344 dots)
	E - ACTIVE TIME	7.666 µs (1,764 dots)
	F - FRONT PORCH	0.365 µs (84 dots)
V	f V	182.1182 Hz
	A - PERIOD	5.491 ms (530 lines)
	B - BLANKING TIME	0.363 ms (35 lines)
	C - SYNC WIDTH	0.031 ms (3 lines)
	D - BACK PORCH	0.321 ms (31 lines)
	E - ACTIVE TIME	5.128 ms (495 lines)
	F - FRONT PORCH	0.010 ms (1 lines)
SYNC POLARITY(H/V)		Negative / Negative

7.4 ACCEPTABLE TIMING

- If your timing is within following specification, this CRT display can automatically function with a certain size and position.

Horizontal: Sync frequency: 30.0 ~ 95.0 kHz
Blanking Time: ≥ 2.7 μs
Back Porch: ≥ 1.25 μs
Front Porch: ≤ Back Porch
Sync Width : 0.948 ~ 4.0μs($f_{H<50KHz}$)
0.948 ~ 2.5μs($f_{H>50KHz}$)

Vertical: Sync frequency: 50.0 ~ 180.0 Hz
Blanking Time: ≥ 0.5 ms
Back Porch: ≥ 0.4 ms
Sync Width: ≥ 0.032 ms

- Several items like size, position and distortion can be adjusted through OSD menu, and if you want to keep it, please push the key [1] for memory, or keep the key untouched for about 20 seconds, it is automatically memorized.

NOTE : In case of RECALL, the key is untouched for about 30 seconds, RECALL function will be canceled.

Please note, however, that there is the case you can not get the size and/or position you want,
(for example, in case Display video time is too short, you can't get proper size of the image.)

- The CRT adopted in this CRT display is designed to minimize the moire phenomenon at suitable size for typical display modes. However, there might be a display format among many formats, in which the moire phenomenon appears on this display.

7.5 SIGNAL LEVEL AND INPUT IMPEDANCE

7.5.1 Video Signal level

- This CRT display is adjusted at the factory using 0.7Vpp Video Signal. Black level is 0 V.
- This CRT display is compatible with 1.0Vpp Video signal by using Video input level selection.

5.5.2 Sync Signal level

- H/V Separate, H/V Mixed : TTL level
- Sync on Green : 0.3 V pp ±0.015V

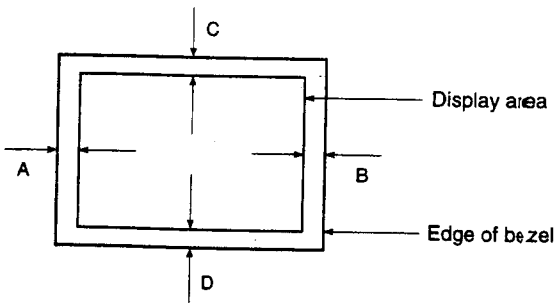
5.5.3 Input impedance

- Video input: 75 Ω typ. (DC and AC Range)
- Sync input: ≥ 1 kΩ

7.6 DISPLAY PERFORMANCE

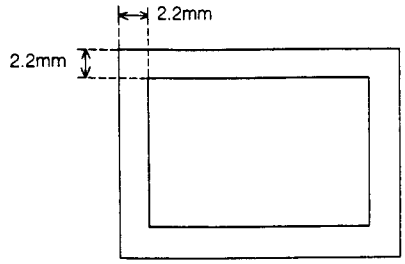
7.6.1 Display area
<Normal scan>
1) PRESET TIMING
MODE 1,1280 × 1024 @85Hz
WIDTH : 352 mm ± 5 mm
HEIGHT : 264 mm ± 5 mm
2) RESERVATION TIMING
MODE 2, 640 × 480 @60Hz
WIDTH : 352 mm ± 7 mm
HEIGHT : 264 mm ± 7 mm
MODE 3, 800 × 600 @75Hz
WIDTH : 352 mm ± 7 mm
HEIGHT : 264 mm ± 7 mm
MODE 4,1024 × 768 @75Hz
WIDTH : 352 mm ± 7 mm
HEIGHT : 264 mm ± 7 mm
MODE 5,1152 × 864 @75Hz
WIDTH : 352 mm ± 7 mm
HEIGHT : 264 mm ± 7 mm
MODE 6,1280 × 1024 @75Hz
WIDTH : 352 mm ± 7 mm
HEIGHT : 264 mm ± 7 mm
MODE 7,1152 × 864 @85Hz
WIDTH : 352 mm ± 7 mm
HEIGHT : 264 mm ± 7 mm
MODE 8,1600 × 1200 @75Hz
WIDTH : 352 mm ± 7 mm
HEIGHT : 264 mm ± 7 mm
3) <Full scan>
WIDTH : 365 mm
HEIGHT : 274 mm

7.6.2 Centering
1) PRESET TIMING (MODE1)
IA – BI ≤ 4 mm
IC – DI ≤ 4 mm
2) RESERVATION TIMING (MODE2~8)
IA – BI ≤ 7 mm
IC – DI ≤ 7 mm



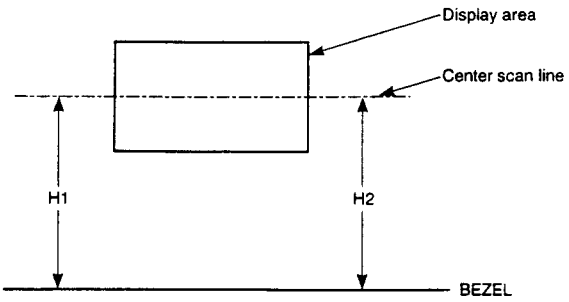
7.6.3 Distortion

Inside 2.2 mm frame.



7.6.4 Rotation

$|H1 - H2| \leq 2.5$ mm



7.6.5 Linearity

Horizontal linearity

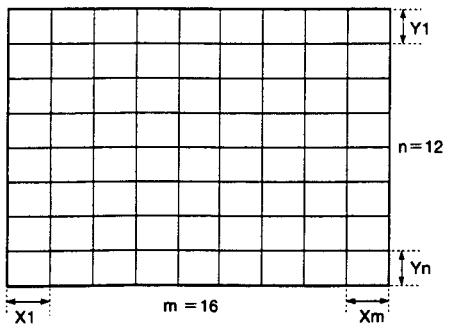
$$= \frac{X\ max. - X\ min.}{X\ max. + X\ min.} \times 100\% \leq 5\%\ (Preset\ Timing)$$

6% (Reservation Timing)

Vertical linearity

$$= \frac{Y\ max. - Y\ min.}{Y\ max. + Y\ min.} \times 100\% \leq 5\%\ (Preset\ Timing)$$

6% (Reservation Timing)



<Conditions>

Display image ------- crosshatch pattern

Maximum and minimum values should not be adjacent to each other.

X max. is maximum value among X1~Xm.

X min. is minimum value among X1~Xm.

Y max. is maximum value among Y1~Yn.

Y min. is minimum value among Y1~Yn.

7.7 GENERAL PERFORMANCE

7.7.1 Maximum Pixel Clock

202.5MHz (Typ.)

7.7.2 Maximum luminance

Value	**120 cd/m² (Typ) for 5% white field at the center of the display area. 103 cd/m² (Typ) for 100% white field at the center of the display erea. Specified by 9300k + 27 MPCD**
Conditions	**Display image : White full flat field Luminance :Max (Contrast : Max.) (Brightness : Center point)**

7.7.3 Minimum luminance

Value	**≤ 17 cd/m² at the center of rhe display area. Specified by 9300k + 27 MPCD**
Conditions	**Display image : White full flat field Luminance :Max (Contrast : Max.) (Brightness : Center point)**

7.7.4 Brightness variation

Value	75 % (Min.) Variation = C/A X 100
Conditions	Display image : White full flat field Luminance : Max (Contrast : MAX) (Brightness : Center point) A ; Luminance at center position C ; Luminance at position of lowest brightness

7.7.5 Display area regulation

	Display area variation	Range of variation
Due to Luminance	within 1.0 %	Contrast : min.~ max. (white full flat field)
Due to Power Supply	within 0.5 %	AC : 90 - 132 V or 198 - 264 V
Due to Temperature	within 1.0 %	20° C ± 15° C

7.7.6 Color Point

< Conditions >

Display image : White flat field at the center of the display area.

Luminance : Brightness Center point.

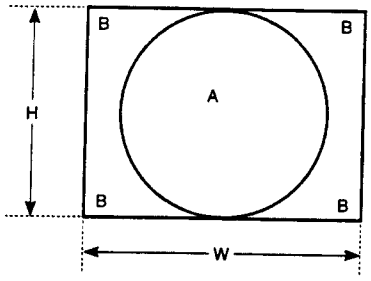
Contrast	Max.	Min.
Conditions	9300 k +27 MPCD x = 0.281 ± 0.020 y = 0.311 ± 0.020	9300 k +27 MPCD x = 0.281 ± 0.020 y = 0.311 ± 0.020

<Conditions>

Display image : Crosshatch pattern mixed with R, G and B colors.

Convergence gauge : KLEIN CM7AG or equivalent.

Display area : W x H 352 x 264 mm (ϕ = 264 mm)



Zone A: 0.30 mm (max.)

Zone B: 0.40 mm (max.)

7.7.8 White Uniformity

$| xa - xc | \leq \pm 0.015$

xa : x coordinate at the CRT center

xc : x coordinate at any other point

$| ya - yc | \leq \pm 0.015$

ya : y coordinate at the CRT center

yc : y coordinate at the any other point

<Conditions>

Display image : White full flat field

Luminance : Contrast : max. , Brightness : Center

Display area : 352 x 264 mm

7.7.9 Purity

Conspicuous mislanding shall not be visible within display area at a distance of 60cm from CRT surface.

<Conditions>

Display image : Red/Green/Blue flat field

Luminance : Contrast max, Brightness Center

Display area : 352 x 264 mm

7.7.10 Jitters

Invisible at a distance of 60 cm from CRT surface.

8. ENVIRONMENT

8.1 AMBIENT TEMPERATURE, HUMIDITY AND ALTITUDE

	Operating	Storage and shipment
Temperature	5 ~ 35° C	-20 ~ +60° C
Humidity	5 ~ 90 % *	5 ~ 90 % *
Altitude	3,000 m (Max.)	12,000 m (Max.)

* Non-condensation

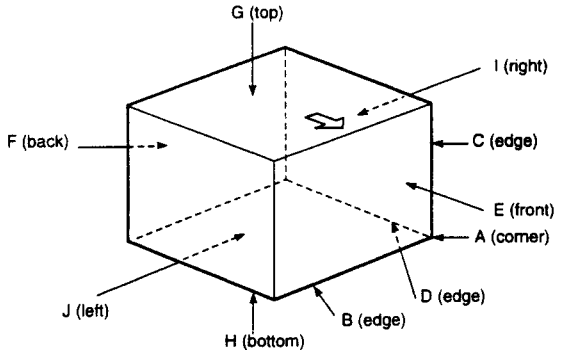
8.2 Vibration and shock

8.2.1 Vibration

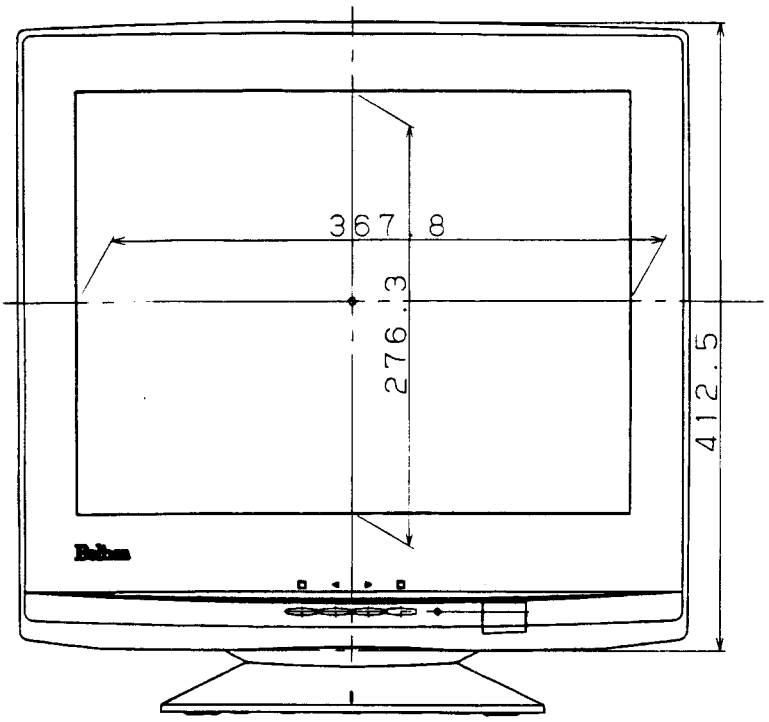
	Order of tests	Direction of vibration		Acceleration		Frequency	Sweep	Test time
				Non-operation	Storage and shipment			
Unpacked	1	Vertical	Up to down	2.9 m/s² (0.3 G)		.5 - 55 Hz	120 s	30 min.
	2	Horizontal	Front to back					15 min.
	3		Right to left					
Packed	1	Vertical	Up to down		0.98 Grms	5 - 200 Hz	Random	40 min.
	2	Horizontal	Front to back		0.72 Grms			20 min.
	3		Right to left					

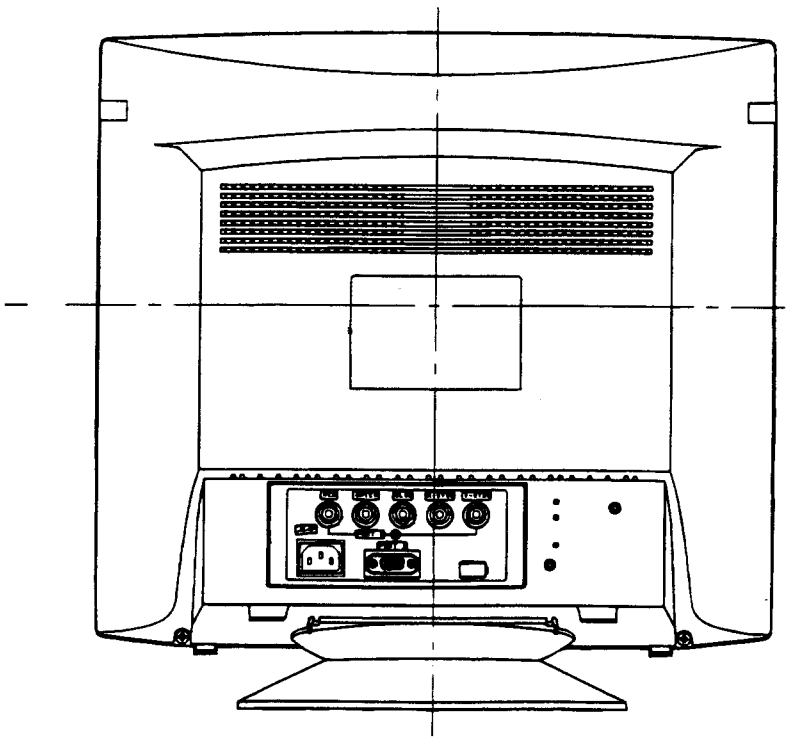
8.2.2 Shock (Drop test)

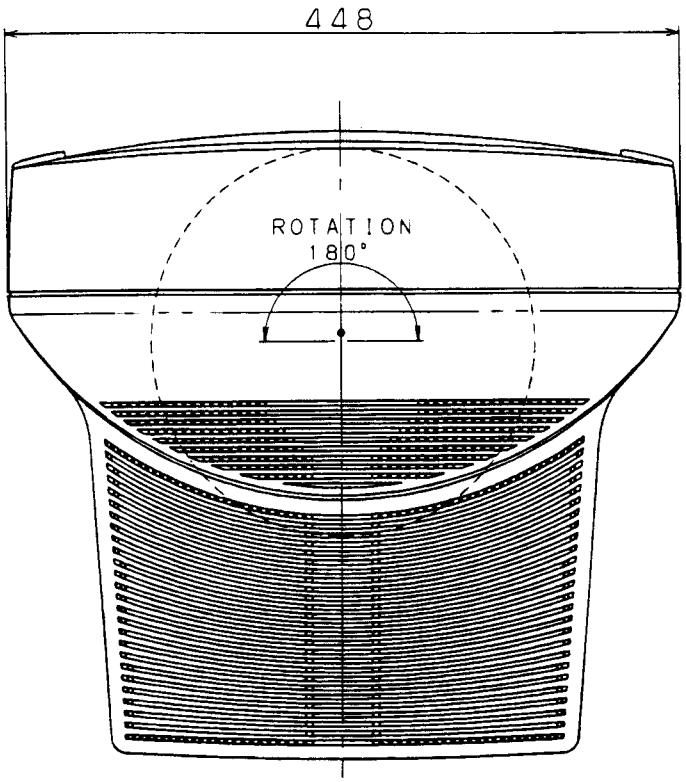
Unpacked	196 m / s² (20 G) One time for each face (6 faces) (non-operation)			
Packed	Order of drop	Face to drop is to face the floor. (See the figure)	Height	Number of drop
	1	A, B, C, D, E, F, G, I, J	46 cm	1 time for each
	2	H	55 cm	

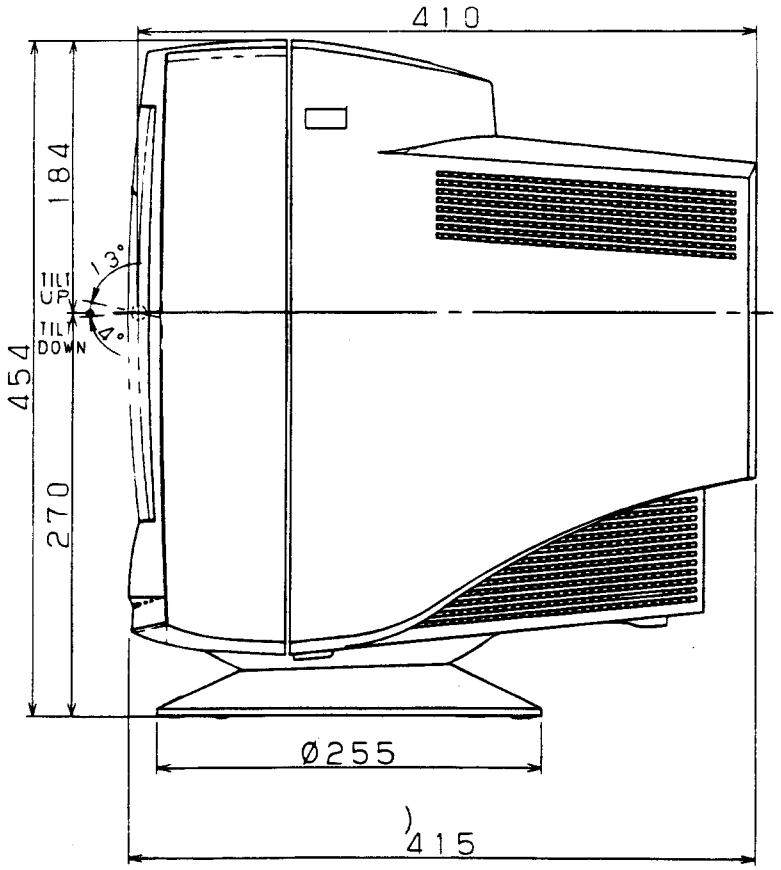


DIMENSIONS






448
ROTATION
180°

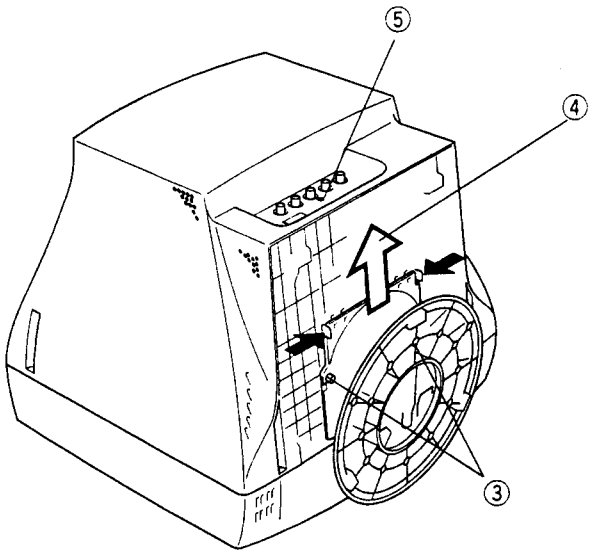

410
184
454
270
13°
TILT UP
4°
TILT DOWN
Ø255
415

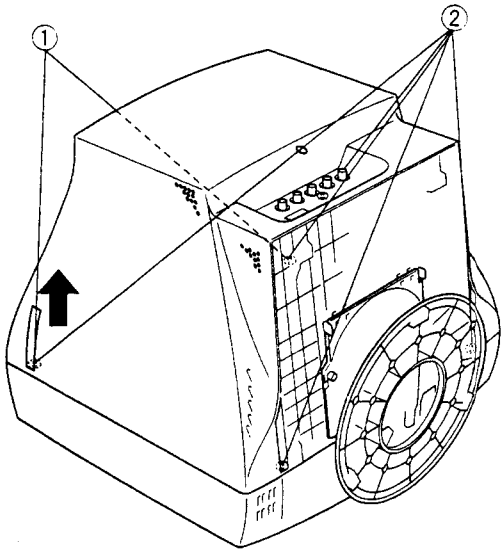
DISASSEMBLY INSTRUCTIONS

1. Rear cover removal

Note: Spread a mat underneath to avoid damaging the CRT surface.

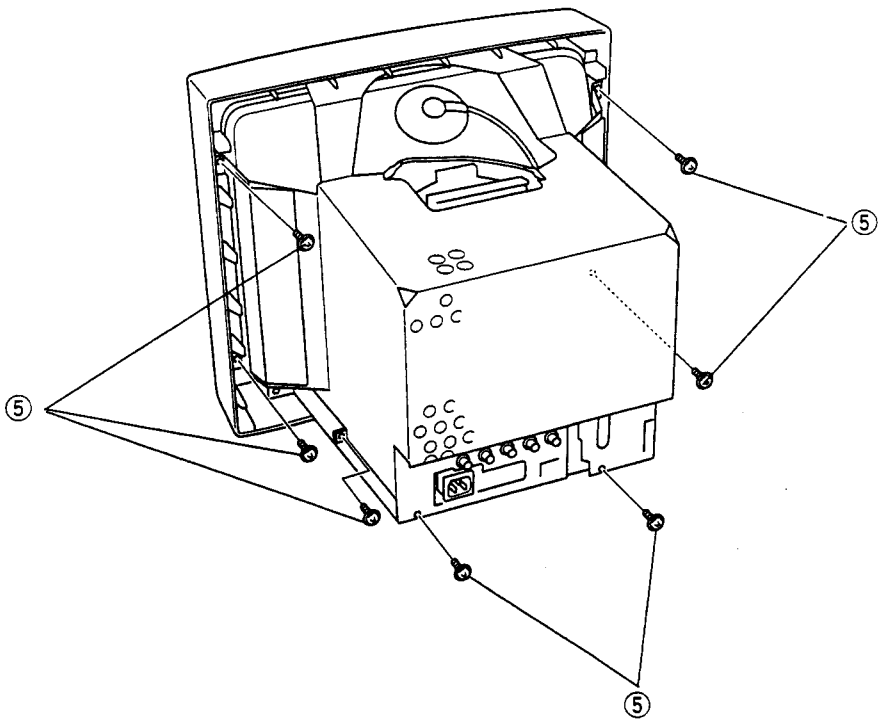
1) Remove the two screw covers. ①
2) Remove the five screws.②
3) Remove the monitor stand.
   Pull a stand upward after you push a lock part inside.③,④





2. Video PCB removal

Remove the seven screws .

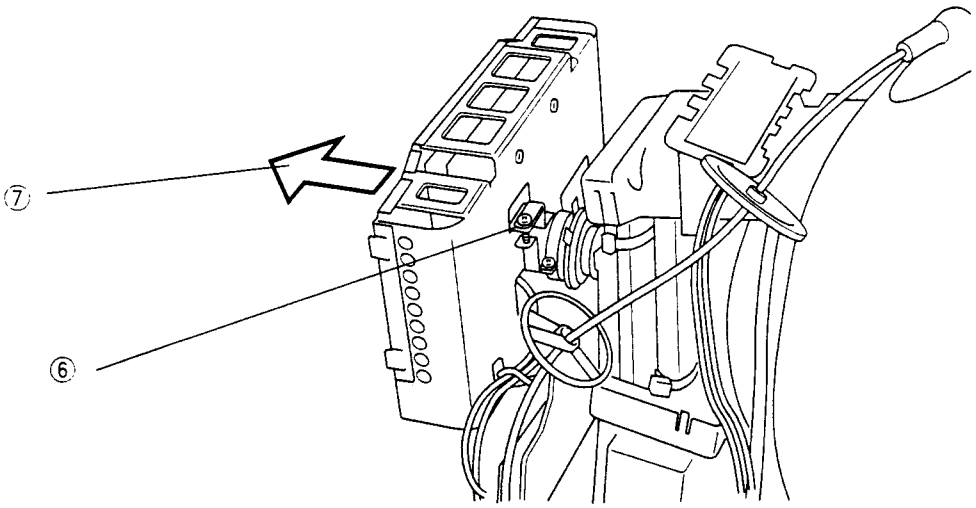


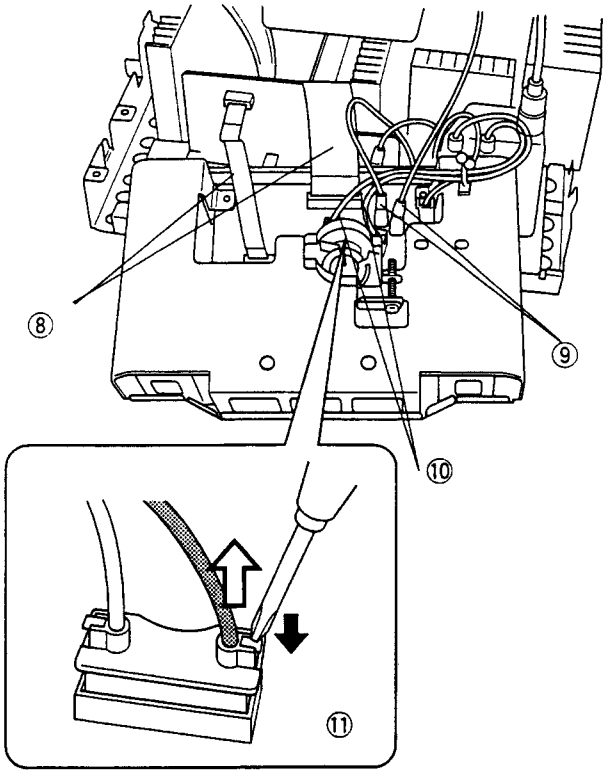
3. Video PCB removal

1) Loosen the screw for video PCB fixation.⑥
2) Quote video PCB at the back,and remove it.⑦
3) Remove the two flexible PCB.⑧

Note: Do not bend or damage the flexible PCB when handling it.

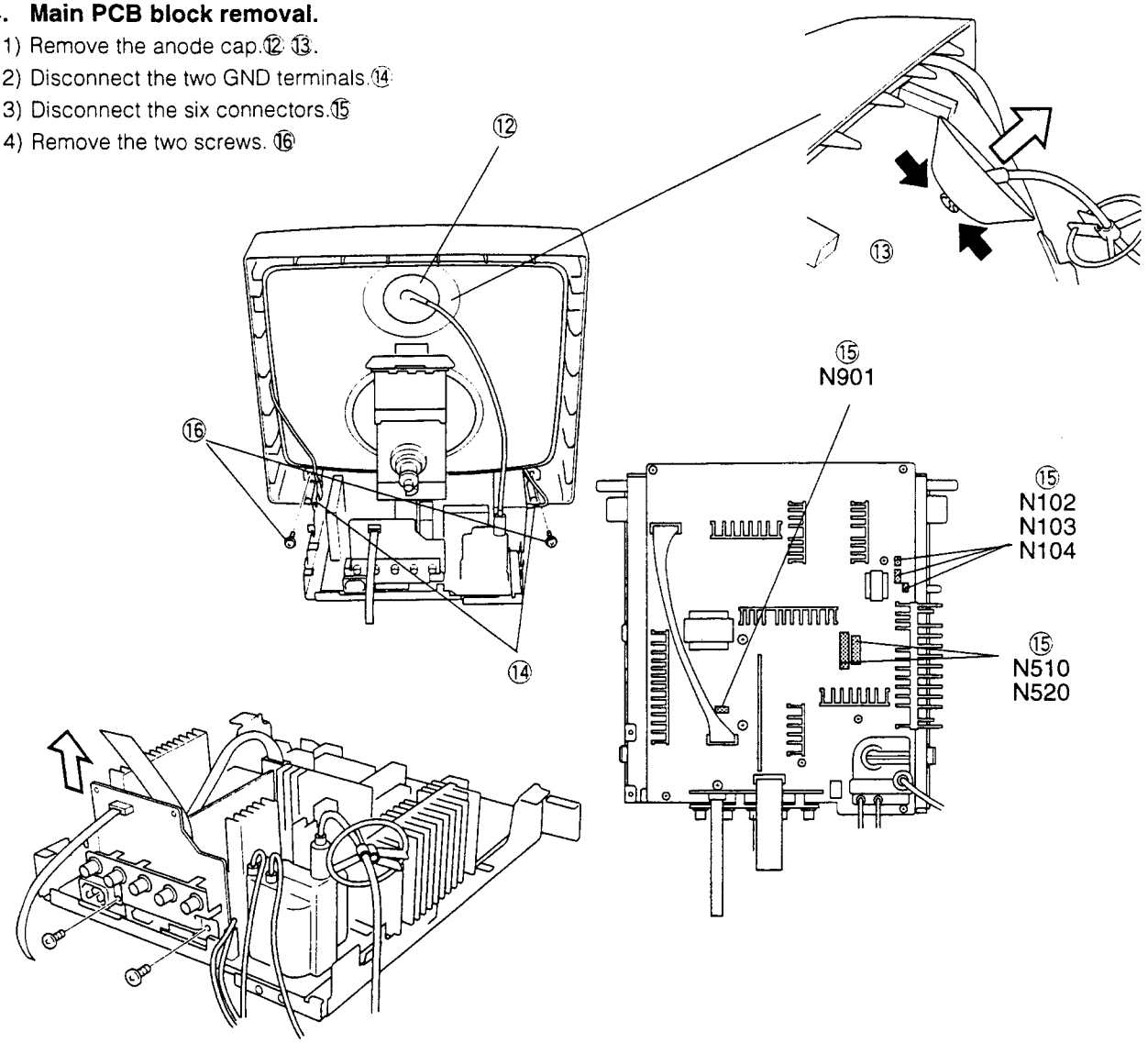
4) Disconnect the two connetors.⑨
5) Remove the two wires than FBT.⑩
   Push a guide,and pull out a wire.⑪





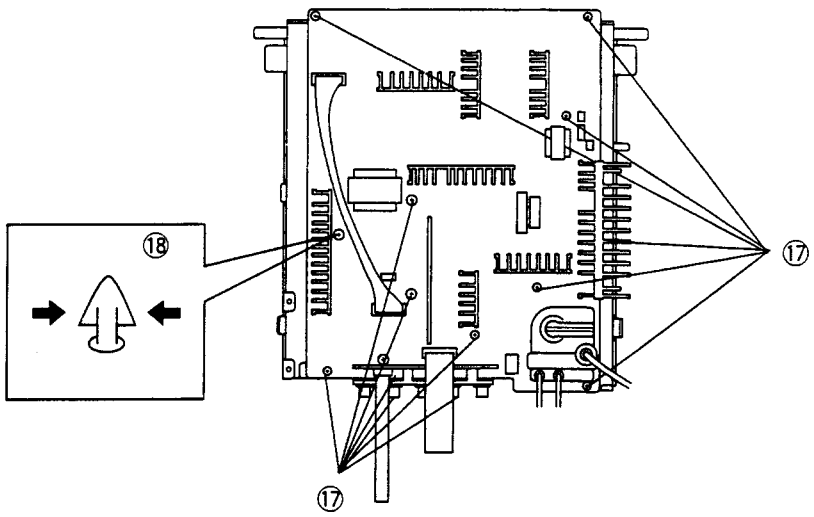
4. Main PCB block removal.

1) Remove the anode cap.⑫ ⑬.
2) Disconnect the two GND terminals.⑭
3) Disconnect the six connectors.⑮
4) Remove the two screws. ⑯

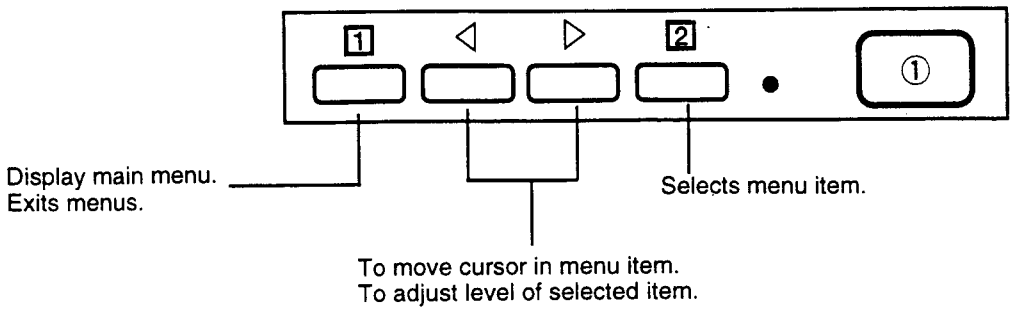


5. Main PCB removal

1) Remove the 13 screws.⑰
2) Unlock a rivet.⑱

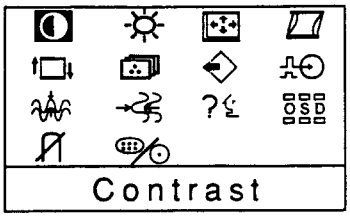


[Basic operation]



Menu screen

The functions that can be adjusted for this unit are displayed as icons.
1)Press the 1 key to return to the menu screen.
2)This is modified by pressing the ◀ and ▶ keys at the front.
3)Press the 2 key to enter the adjustment screen.

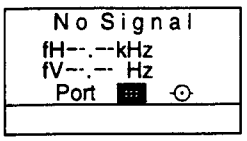


Contrast	Brightness	Size & Pos.	Geometry
Rotation	Color Temp	Recall	Video Level
H.Moire	V.Moire	Language	OSD Position
Degauss	Signal		

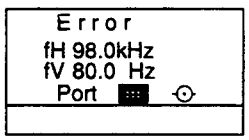
Adjustments

Self-Test menu(No Signal screen

This display indicates that the monitor is operating normally.When one of the following conditions occurs,press one of the 4 operation keys to call the appropriate display.



No signal (The computer is not connected or the mains power to the computer is disconnected)



The horizontal or vertical sync. signal are outside of the permitted range (the value of the horizontal sync. signal will be displayed in red and the value of the vertical sync. signal will be displayed in white)

CAUTION FOR ADJUSTMENT AND REPAIR

1. Degaussing is inevitably required at purity adjustment or convergence adjustment.
2. If you check or adjust electrical specification or function, more than 20 minutes burn-in is required.
3. Reforming of the lead wire is required after your repair work.
4. Prior to starting work, be sure to check that the input signal is at the specified timing and that the polarity is as specified in all modes.
5. Brightness control: After mounting the rear cover, brightness tends to decrease about 5 cd/m² on a flat white field and about 1 cm/m² on a white raster field. This should be taken into consideration.
6. Brightness stabilizing time: It takes about 20 to 50 seconds for the brightness to stabilize after turning the power off for 5 seconds (AC). Therefore, care should be taken to this.
7. Aging should be made in white raster of 30 ~ 50 cd/m².
8. Set the CONTRAST to MAX and BRIGHTNESS to CENTER using the O.S.D.

CAUTION FOR SERVICING

When servicing or replacing the CRT, high voltage sometimes remains on the anode. So, completely discharge high voltage before servicing or replacing the CRT so as to prevent a shock to the service person.

CRT Anode Discharge

1. When you check the CRT anode or replace the CRT, discharge the CRT anode to the external conductive coating (aquadag) of CRT, especially when checked right after power turn-off.
2. Ground one end of a jumper wire which has a resistor (30 kV < resisting pressure 100 MΩ) and connect the other point to the CRT anode.

Note: Grounding must be done first.

This model has a section that does not share a common ground with the power supply section. The different sections are referred to as the HOT section and the COLD section in the precautions below.

1. Do not touch the HOT section and the COLD section at the same time. You may be hit by an electric shock.
2. Do not short the HOT section to the COLD section. This could blow the fuse or damage parts.
3. Never measure the HOT section and the COLD section at the same time when using tools such as oscilloscopes or multimeters.
4. Always unplug the unit before beginning any operation such as removing the chassis.

ADJUSTMENT AND CHECK PROCEDURE

INTRODUCTION

- This monitor is controlled by a microcomputer. With the exception of purity/convergence/focus all is digitally adjusted.
  Therefore a computer, the dedicated control software, the dedicated interface, a 9~12 V power supply, and a signal generator are required servicing.

TOOLS REQUIRED

- **Computer**
  The control software is IBM PC compatible only. Therefore, it is not compatible with any other operating systems. For further information please contact our sales office.

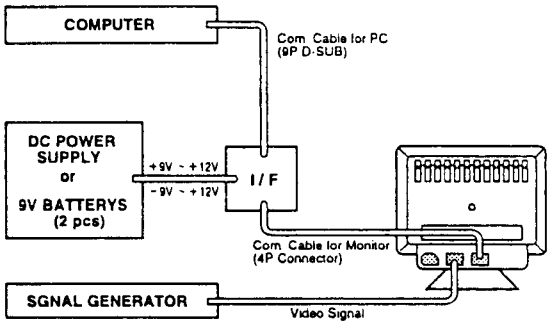
- **Control Software**
  The HV10H chassis can only use adjustment program disk" for this model. No other program can access the EEPROM on the monitor. For further information please contact our sales office.

- **Interface**
  The interface is dedicated to work only with the control software and the HV chassis. There are no substitutes for this interface. For further information please contact our sales office.

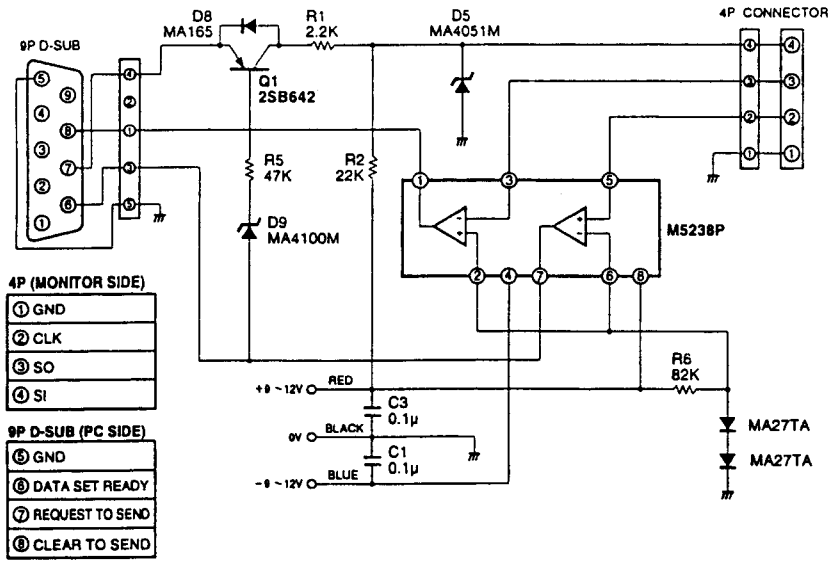
- **Power Supply**
  A DC 9~12 V (+9~12 V/-9~12 V) power supply is required for operating the interface.

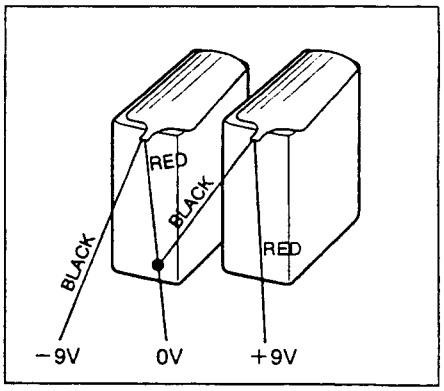
- **Signal Generator**
  It is necessary for you to use a signal generator which operates on fH 97 kHz, fv 185 Hz, and fc 240MHz bands.

INTERFACE CONNECTION



INTERFACE SCHEMATIC DIAGRAM





BATTERY CONNECTION

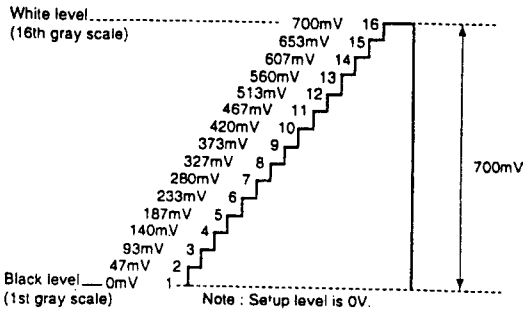
OTHER TOOLS

- Oscilloscope (dual trace)
- Scope probe – Attenuation: 100:1
  Attenuation: 10:1
- Digital Voltmeter – Range: 0 to 1000 V DC
  Accuracy: 0.1 %
- TV color Analyzer II – that reads luminance and chromaticity X and Y coordinates.
- High Voltag Probe
- AC power supply – Output voltage : 0 to 300 V
- Degaussing coil
- Convergence meter
- Scale
- Microscope – Scale factor: 50

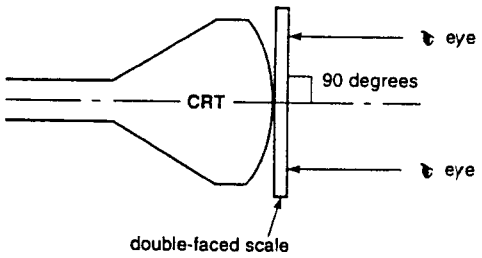
STANDARD CONDITION OF ADJUSTMENT PROCEDURE

- Signal timing : Preset timing
- Display pattern : White, full "H" character
- Signal level : V/H: TTL level video: 700 mV
- Input source : AC 100~240 V, 50/60 Hz
- Ambient temperature : Room temperature
- Warm-up time : More than 30 minutes
- Brightness control : Center
- Contrast control : Max.
- Magnetic field : Vertical: 40 μT
  Horizontal: 0 μT
- Signal cable : Attached

Video input signal from PC.



- Use a Helmholtz device to adjust an unit with no horizontal magnetic field and a vertical field of 40 μT. Inspect the unit under the same conditions.
- The ambient illuminance must be 200 lux.
- Use an external degaussing coil any time the DEGAUSS switch does not remove color shading.
- To check the image width, height, linearity and distortion, proceed as below.



ADJUSTMENT SOFTWARE

1. Software operating procedure

A) Power on the computer.

B) Connect the Communication cable for monitor adjustment.

C) Insert the adjustment disk into the drive.

D) At the A:> prompt type "VSR" , then press [ENTER].

> A function to identify the connected monitor is provided to prevent accidents due to erroneous use of the HV10H chassis program. If this program is used for any monitor other than the HV10H, the message reading "This monitor is not an HV10H chassis. All further activity has been prevented" is displayed and the operation is stopped.

E) Refer to the adjustment procedures.

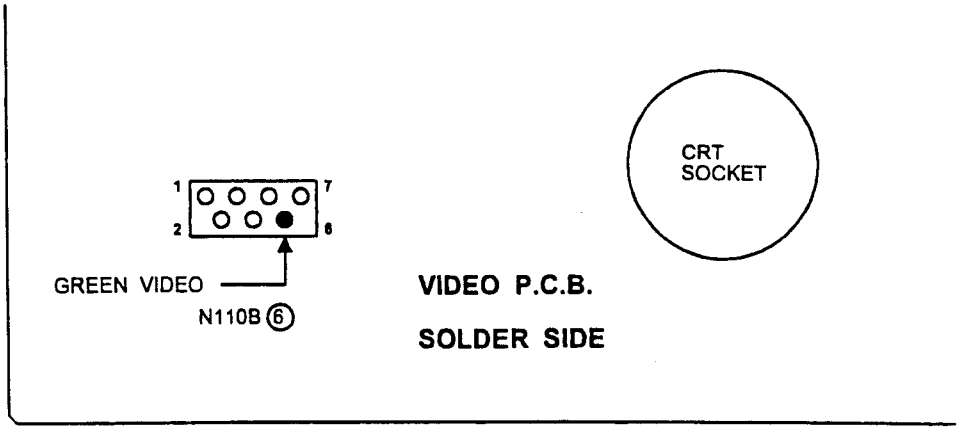
2. Adjustment Program

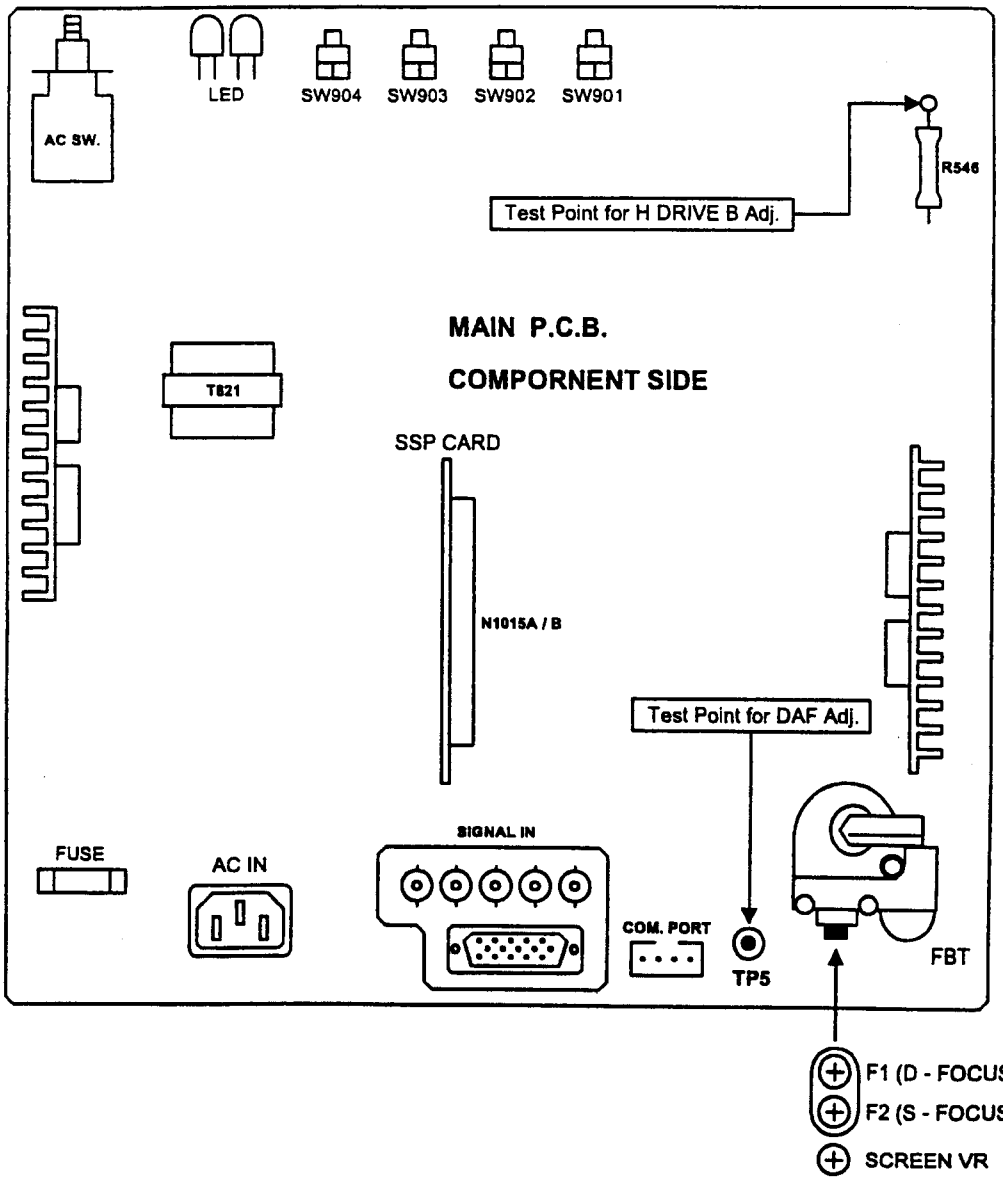
Main Menu of Adjustment Program

<<HV10H ADJUSTMENT PROGRAM MENU>>
(e: exit, q: quit) <Ver *.*>

1) Load data from FILE	6) Save data to FILE
2) Adjust VSR setting	7) Special ADJUST
3) Adjust STD setting	8) Information Service
4) Adjust Factory preset	9) Show Version & Error
5) Clear User preset	10) DDC EDID Date seeting

SERVICE ADJUSTMENT CONTROL LOCATION





REQUIRED ADJUSTMENT PROCEDURE AFTER A PARTS IS REPLACED (✓ IS REQUIRED)

	ADJUSTMENT ITEM	REPLACED PARTS																
		MAIN P.C.B.	SSP CARD	VIDEO P.C.B.	CRT DY	IC1301 IC1302 IC1303 IC1305 IC1331	Q1065 Q1165 Q1265	IC490	IC580	Q550 IC850 Q881	FBT IC671 Q601							
A	DATA SETTING *	✓	✓															
B	H. DRIVE +B ADJUST	✓	✓						✓									
C	EHT ADJUST	✓	✓		✓						✓							
D	H CENTER ADJUST	✓	✓		✓					✓								
E	VSR SETTING	✓	✓		✓			✓		✓	✓							
F	PRESET ADJUST	✓	✓		✓			✓		✓	✓							
G	SUB ADJUST	✓	✓		✓			✓		✓	✓							
H	BRIGHTNESS, COLOR	✓	✓	✓	✓	✓	✓				✓							
I	DAF ADJUST	✓	✓		✓						✓							
J	FOCUS ADJUST	✓	✓		✓						✓							
K	DATA SAVING	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓							
L	DDC DATA SETTING	✓	✓															
	PURITY & CONVERGENCE				✓													
	SCREEN CHECK	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓							

*** (A) DATA SETTING : Do not load standard data except when main PCB and SSP Card are replaced.**

ADJUSTMENT PROCEDURE

Note 1 : Check to be sure that the program disk name is **106070** before making necessary adjustment.

Note 2 : Unless otherwise specified, the monitor state is as given at right.

Note 3 : The underlined places indicate the adjustment items on the screen of the PC.

1. Description of Adjustment Method

	ITEM Program Menu	❖ Test Meter ⊙ Test Point ☐ Pattern	JOB CODE	Input Signal	Operation	Adjusting Value
A	**STANDARD DATA SETTING** 1) Load data from FILE		A1 A2 A3 AE		Turn on the power switch of the monitor. Set the cell to the menu at left and press [↵]. A massage **FILE -> EEPROM FILE NAME (q or Q escape) [ ] :** is displayed. So key in the DACDATA.DAT (when using the standard data) and press [↵]. Turn off the power switch of the monitor, then turn on again.	
	Do not load standard data except when Main P.C.B. and SSP Card are replaced.					
B	H. DRIVE +B 2) Adjust VSR setting	❖ Digital Voltmeter ⊙ R546 ~ GND Refer to Service Adjustment Control Location for this connect point. ☐ Crosshatch	B1 B2 B3 B4 B5 B6 B7 B8 B9 B10 B11 B12 BE	 HV10H-1 HV10H-2 HV10H-3 HV10H-4 	Set the cell to the menu at left and press [↵]. Set the cell to the adjusting mode INTP [0] and press [↵]. Check that the input signal to the monitor is [fH 29.1KHz] and [fV 47.5Hz] and press [↵]. Set the cell to H. DRIVE +B and press [↵]. Make the adjustment to the value shown at right by using [←] and [→]. Register by press [↵] and return to menu of **B2** by press [**E**]. Input signal [fH 52.2kHz] and [fV 92.3Hz] Select Adjusting mode INTP [1], and repeat above (**B4 B5 B6**) procedure. Input signal [fH 75.2kHz] and [fV 137.2Hz] Select Adjusting mode INTP [2], and repeat above (**B4 B5 B6**) procedure. Input signal [fH 96.5kHz] and [fV 182.1Hz] Select Adjusting mode INTP [3], and repeat above (**B4 B5 B6**) procedure. Press [**E**] to return to main menu.	19.5V ±0.5V 19.5V ±0.5V 19.0V ±0.5V 18.5V ±0.5V

	ITEM Program Menu	❖ Test Meter ⊙ Test Point ☐ Pattern	JOB CODE	Input Signal	Operation	Adjusting Value
C	**EHT ADJUST** 3) Adjust OTHER setting Adjust NON-VSR Setting	❖ Digital Voltmeter ❖ High Voltage Probe ⊙ Anode Cap ~ GND ☐ RGB off (Sync only)	C1 C2 C3 C4 C5 C6 C7 C8 CE	 HV10H-4	Turn the power switch of the monitor OFF. Connect high voltage probe to Anode Cap and GND. Turn the power switch of the monitor ON. Set the cell to the menu at left and press [↵]. Set the cell to Adjust NON-VSR Setting and press [↵]. Check that the input signal to the monitor is [fH 96.5kHz] and [fV 182.1Hz] and press [↵]. Move the cell to EHT and press [↵]. Make adjustment to the value shown at right by using [←] and [→]. Register by pressing [↵] and return to menu of **C5**, then return to the main menu by pressing [**E**].	25kV ±0.3kV
D	**H. CENTER** 2) Adjust VSR setting	☐ RGB off (Sync only)	D1 D2 D3 D4 D5 D6 D7 D8 D9 D10 D11 D12 D13 DE	 HV10H-1 HV10H-2 HV10H-3 HV10H-4 	Set the Brightness to MAX by using OSD. Set the cell to the menu at left and press [↵]. Set the cell to the adjusting mode INTP [0] and press [↵]. Check that the input signal to the monitor is [fH 29.1kHz] and [fV 47.5Hz] and press [↵]. Set the cell to H CENTER and press [↵]. Make the adjustment to the value shown at right by using [←] and [→]. Press [↵] to register, and return to menu of **D3**. Input signal [fH 52.2kHz] and [fV 92.3Hz] Select Adjusting mode INTP [1], and repeat above (**D5 D6 D7**) procedure. Input signal [fH 75.2kHz] and [fV 137.2Hz] Select Adjusting mode INTP [2], and repeat above (**D5 D6 D7**) procedure. Input signal [fH 96.5kHz] and [fV 182.1Hz] Select Adjusting mode INTP [3], and repeat above (**D5 D6 D7**) procedure. Return to the main menu by pressing [**E**].	A A=B B Back raster Set the raster to the center with respect to the bezel.

	ITEM Program Menu	❖ Test Meter ⊙ Test Point ☐ Pattern	JOB CODE	Input Signal	Operation	Adjusting Value
E	**VSR SETTING** 2) Adjust VSR Setting	☐ Crosshatch	E1 E2 E3 E4 E5 E6 E7 E8 E9 E10 E11 EE	 HV10H-1 HV10H-2 HV10H-3 HV10H-4 	Set the cell to the menu at left and press [↵]. Set the cell to the adjusting mode INTP [0] and press [↵]. Check that the input signal to the monitor is [fH 29.1kHz] and [fV 47.5Hz] and press [↵]. Set the cell to following items, press [↵] and make the adjustment to the value shown at right by using [←] and [→]. * V POSITION ① H. SIZE ③ V SIZE ② H POSITION ④ V PCC GAIN Press [↵] to register, and return to menu of **E2**. Input signal [fH 52.2kHz] and [fV 92.3Hz] Select Adjusting mode INTP [1], and repeat above (**E4 E5**) procedure. Input signal [fH 75.2kHz] and [fV 137.2Hz] Select Adjusting mode INTP [2], and repeat above (**E4 E5**) procedure. Input signal [fH 96.5kHz] and [fV 182.1Hz] Select Adjusting mode INTP [3], and repeat above (**E4 E5**) procedure. Return to the main menu by pressing [**E**].	 ① : 352mm ±5 ③ : 264mm ±5 ② H Posi : Center ④ : Best point
		V Position adjustment do not register to interpolation data.				
F	**PRESET ADJUST** 4) Adjust Factory preset	☐ Crosshatch	F1 F2 F3 F4 F5 F6 F7	Mode-1 Mode-2 	Set the cell to the menu at left and press [↵]. Check that the input signal to the monitor is [fH 91.1KHz] and [fV 85.0Hz] and press [↵]. Set the cell to following items, press [↵] and make the adjustment to the value shown at right by using [←] and [→]. ① H. SIZE ⑤ V. PCC ② H. POSI ⑥ V. PCC BALANCE ③ V. SIZE ⑦ TRAPEZOID ④ V. POSI ⑧ PARALLEL After adjustment, return to main menu by pressing [**E**] and [**Y**]. Check that the input signal to the monitor is [fH 31.5KHz] and [fV 60.0Hz] and press [↵]. Make adjustment ①~⑧ of **F3** to the value shown at right by using [←] and [→]. After adjustment, return to the menu of **F2** by pressing [**E**] and [**Y**]. **- To be continued -**	① : 352mm ±5 ③ : 264mm ±5 ②④ : Center ⑤⑥⑦⑧ : Best point ① : 352mm ±7 ③ : 264mm ±7 ②④ : Center ⑤⑥⑦⑧ : Best point

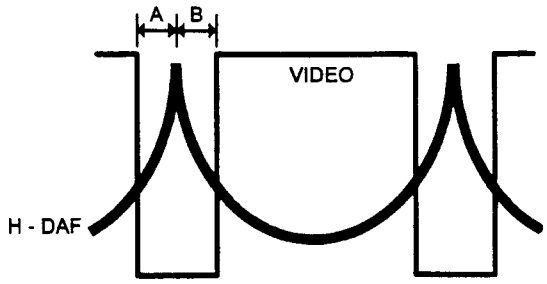
	ITEM Program Menu	❖ Test Meter ⊙ Test Point ☐ Pattern	JOB CODE	Input Signal	Operation	Adjusting Value
F	**PRESET ADJUST** 4) Adjust Factory preset	☐Crosshatch	F8 F9 F10 F11 F12 F13 F14 F15 F16 F17 F18 F19 F20 F21 F22 F23 F24 FE	Mode-3 Mode-4 Mode-5 Mode-6 Mode-7 Mode-8 	Check that the input signal to the monitor is [fH 46.9KHz] and [fV 75.0Hz] and press [↵]. Make adjustment ①~⑧ of **F3** to the value shown at right by using [←] and [→]. After adjustment, return to the menu of **F2** by pressing [**E**] and [**Y**]. Check that the input signal to the monitor is [fH 60.0KHz] and [fV 75.0Hz] and press [↵]. Make adjustment ①~⑧ of **F3** to the value shown at right by using [←] and [→]. After adjustment, return to the menu of **F2** by pressing [**E**] and [**Y**]. Check that the input signal to the monitor is [fH 67.5KHz] and [fV 75.0Hz] and press [↵]. Make adjustment ①~⑧ of **F3** to the value shown at right by using [←] and [→]. After adjustment, return to the menu of **F2** by pressing [**E**] and [**Y**]. Check that the input signal to the monitor is [fH 80.0KHz] and [fV 75.0Hz] and press [↵]. Make adjustment ①~⑧ of **F3** to the value shown at right by using [←] and [→]. After adjustment, return to the menu of **F2** by pressing [**E**] and [**Y**]. Check that the input signal to the monitor is [fH 77.1KHz] and [fV 85.0Hz] and press [↵]. Make adjustment ①~⑧ of **F3** to the value shown at right by using [←] and [→]. After adjustment, return to the menu of **F2** by pressing [**E**] and [**Y**]. Check that the input signal to the monitor is [fH 93.8KHz] and [fV 75.0Hz] and press [↵]. Make adjustment ①~⑧ of **F3** to the value shown at right by using [←] and [→]. After adjustment, return to the menu of **F2** by pressing [**E**] and [**N**], then return to the main menu by pressing [**E**].	① : 352mm ±7 ③ : 264mm ±7 ②④ : Center ⑤⑥⑦⑧ : Best point ① : 352mm ±7 ③ : 264mm ±7 ②④ : Center ⑤⑥⑦⑧ : Best point ① : 352mm ±7 ③ : 264mm ±7 ②④ : Center ⑤⑥⑦⑧ : Best point ① : 352mm ±7 ③ : 264mm ±7 ②④ : Center ⑤⑥⑦⑧ : Best point ① : 352mm ±7 ③ : 264mm ±7 ②④ : Center ⑤⑥⑦⑧ : Best point

	ITEM Program Menu	❖ Test Meter ⊙ Test Point ☐ Pattern	JOB CODE	Input Signal	Operation	Adjusting Value
G	**SUB ADJUST** 3) Adjust OTHER setting Adjust NON-VSR Setting	☐ Crosshatch	G1 G2 G3 G4	 Mode-1	Set the cell to the menu at left and press [↵], then go to sub menu. Set the cell to Adjust NON-VSR Setting at the sub menu and press [↵]. Check that the input signal to the monitor is [fH 91.1KHz] and [fV 85.0Hz] and press [↵]. Set the cell to following items, press [↵] and make the adjustment to the value shown at right by using [←] and [→].	②③④⑤⑥⑦⑧: Best point
	H Size, H Position, V Size and V PCC adjustment do not register to interpolation data.				* H. SIZE * H POSITION * V SIZE * V PCC ① V POSITION ⑤ V PCC CORNER ② V LIN (S) ⑥ TRAPEZOID ③ V LIN (C) ⑦ PARALLELOGRAM ④ V PCC (S) ⑧ V PCC BALANCE	① V Posi : Center H : 352mm V : 264mm
			GG		After adjustment, return to menu of **G2** by pressing [**E**], then return to the main menu by pressing [**E**].	
H	**CRT CUT-OFF ADJUST** 3) Adjust OTHER setting Adjust VIDEO Setting	❖ TV Color Analyzer II ☐ RGB Off (Sync only)	H1 H2 H3 H4 H5 ~ H14	Mode-1	Set the Contrast to MAX, Brightness to Center and Color is "9300k +8" using the OSD. Check that the input signal to the monitor is [fH 91.1KHz] and [fV 85.0Hz] and turn off the RGB signal. Set the cell to the menu at left and press [↵] . Set the cell to Adjust VIDEO Setting at the sub menu and press [↵]. Make the adjustment R,G and B Low Light by using [←] [→] and Screen VR to CRT cut-off. **Please refer to flow chart for this adjustment on page 30.**	
	BRIGHTNESS / COLOR ADJUST		H15 H16 H17 H18		Change to the pattern at left. Move the cell to the following items and make the adjustment to the value shown at right by using [←] and [→]. R. SUB CONT (COLOR0) G. SUB CONT (COLOR0) B. SUB CONT (COLOR0) Set Contrast to MIN using the OSD. Move the cell to the following items and make the adjustment to the value shown at right by using [←] and [→]. R. LOW LIGHT G. LOW LIGHT B. LOW LIGHT **Adjust two colors only out of above three as shown in H13 on page 30.**	Y=130 cd/m² x=0.281 ±0.20 y=0.311 ±0.20 x=0.281 ±0.20 y=0.311 ±0.20
		☐ White window (8cm×8cm at center)			**- To be continued -**	

	ITEM Program Menu	❖ Test Meter ⊙ Test Point ☐ Pattern	JOB CODE	Input Signal	Operation	Adjusting Value
H			H19 H20	Mode-1	Set Contrast to MAX using the OSD. Check the value shown at right, then If out of range, to repeat **H15~H18**.	Y=130 cd/m² x=0.281 ±0.20 y=0.311 ±0.20
	ABL	☐ White flat field (full window)	H21 H22		Change to the pattern at left. Move the cell to ABL (COLOR0) and make the adjustment to the value shown at right by using [←] and [→].	Y=110 cd/m²
			H23		Press [**E**] to messages will appear. **Start automatic calculation. OK (y/n) ->**	
			H24		Press[**Y**]and [↵]. **Refresh LOW-LIGHT2 data (y/n) ->**	
			H25		Press[**Y**]and [↵], then return to menu of **H4**.	
			H26		Return to the main menu by pressing [**E**].	
	1.0V ADJUST 7) Special ADJUST 1: Adjust VIDEO 1.0Vpp	☐ White window (8cm×8cm at center)	H27 H28 H29 H30		Change to the pattern at left. Change signal to 1.0V p-p Video. Set the cell to the menu at left and press [↵]. Select the 1: Adjust VIDEO 1.0Vpp from the menu.	
			H31		Make the adjustment to the value shown at right by using [←] and [→].	Y=130 cd/m²
			HE		Press [↵] to return to menu of **H30**, then return to the main menu by pressing [**E**]	
I	**DAF ADJUST** 2) Adjust VSR setting	☐ White flat field ❖ Oscilloscope ⊙ TP5~GND 100:1 probe ⊙ N110B (6) ~ GND 10:1 probe	I 1 I 2 I 3 I 4	 HV10H-1	Set the cell to the menu at left and press [↵]. Set the cell to the menu at left and press [↵]. Set the cell to the adjusting mode INTP [0] and press [↵]. Check that the input signal to the monitor is [fH 29.1kHz] and [fV 47.5Hz].	
			I 5 I 6		Set the cell to H DAF PHASE and press [↵]. Adjust as shown at below by using [←] and [→], and press [↵] for registration. (Refer to **Fig. I6** for adjustment on next page)	
			I 7 I 8		Set the cell to H DAF GAIN and press [↵]. Adjust as shown at right by using [←] and [→], and press [↵] for registration. (Refer to **Fig. I8** for adjustment on next page)	C - D = 422V
			I 9		Press [↵] to register, and return to menu of **I3**.	
			I 10 I 11	HV10H-2	Input signal [fH 52.2kHz] and [fV 92.3Hz] Select Adjusting mode INTP [1], and repeat above (**I5 I6 I7 I8 I9**) procedure.	
			I 12 I 13	HV10H-3	Input signal [fH 75.2kHz] and [fV 137.2Hz] Select Adjusting mode INTP [2], and repeat above (**I5 I6 I7 I8 I9**) procedure.	
			I 14 I 15	HV10H-4	Input signal [fH 96.5kHz] and [fV 182.1Hz] Select Adjusting mode INTP [3], and repeat above (**I5 I6 I7 I8 I9**) procedure.	
			I E		Return to the main menu by pressing [**E**].	

Fig. I6

Set position to A=B



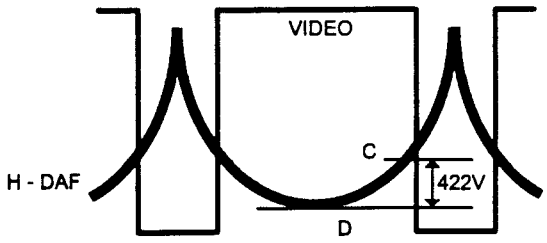
Oscilloscope Range

HV10H - 1 10 μs / div.
HV10H - 2 5 μs / div.
HV10H - 3 5 μs / div.
HV10H - 4 2 μs / div.

Fig. I8

Set voltage to C - D = 422V

C : Clossing VIDEO and H. DAF
D : Bottom of H. DAF



	ITEM Program Menu	❖ Test Meter ⊙ Test Point ☐ Pattern	JOB CODE	Input Signal	Operation	Adjusting Value
J	**FOCUS**	☐ Character	J1 J2 J3 J4	MODE-1	Check that the input signal to the monitor is [fH 91.1KHz] and [fV 85.0Hz]. Make the corner sections of the screen optimum by turning D-FOCUS VR on the FBT. Make the center section optimum by turning S-FOCUS VR on the FBT. Repeat **J2** and **J3** to make it optimum.	
K	**DATA SAVING** 6) Save data to file		K1 K2		Set the cell to the menu at left and press [↵]. Key in the file name after [ ] :. Use serial number as a file name EXAMPLE : 10607098270001 = "9827001.DAT"	

	ITEM Program Menu	❖ Test Meter ◉ Test Point ☐ Pattern	JOB CODE	Input Signal	Operation	Adjusting Value
L	**DDC DATA SET** 10) DDC Data setting		L1 L2 L3 L4 LE		Set the cell to the menu at left and press [↵]. Key in the monitor serial number and press [↵]. (4 digits) Key in the Week of product and press [↵]. (2 digits) Key in the Year of product and press [↵]. (4 digits) Press [**E**] to return to main menu. To get data of **L2** (S/N), **L3** (week) and **L4** (year) by reading **Fig.L** from Serial Number.	

Fig. L

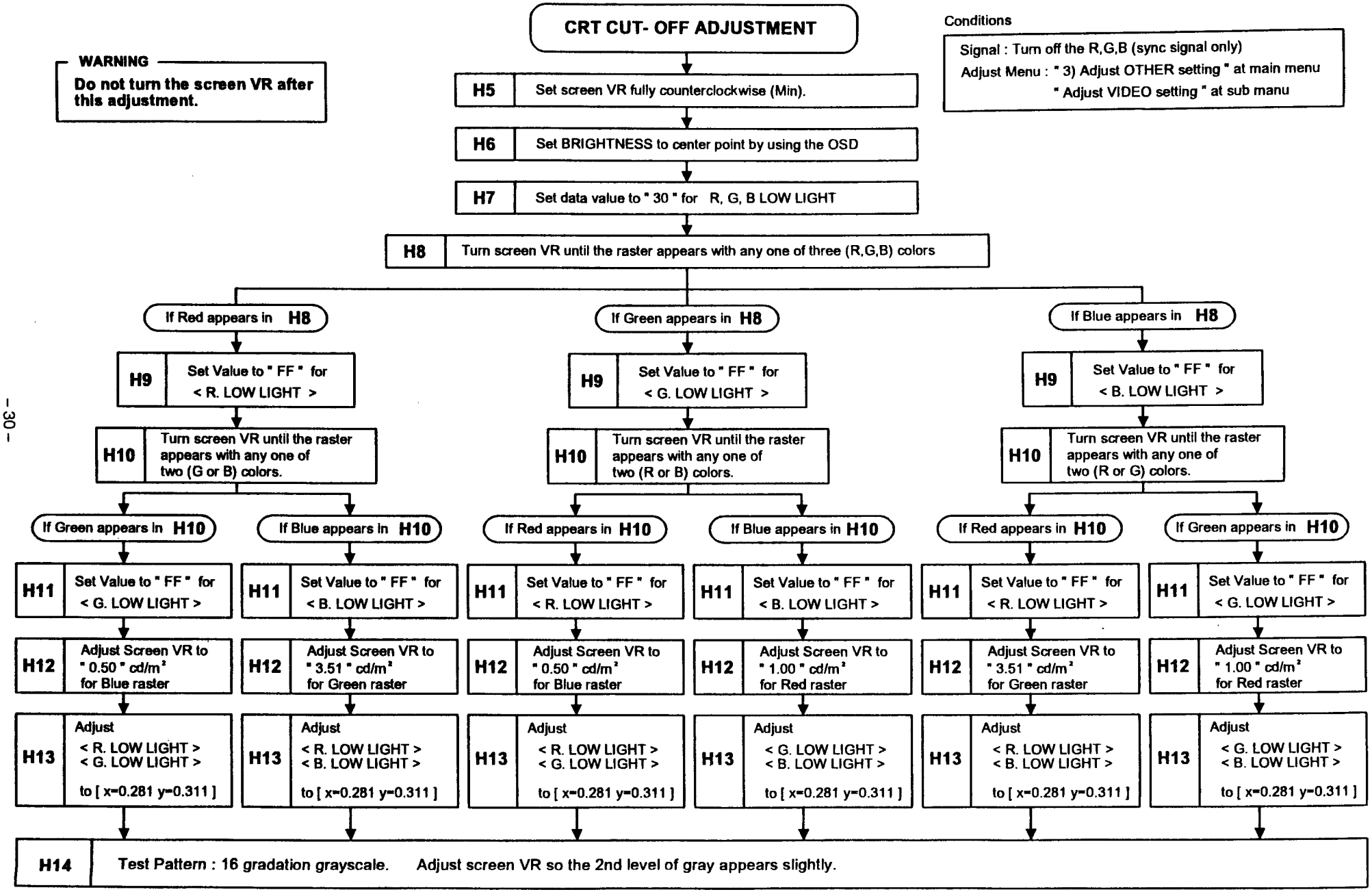
106070	98	27	0001
①	②	③	④

① Model Name
② Year Code
③ Week Code
④ Unit Number

Example

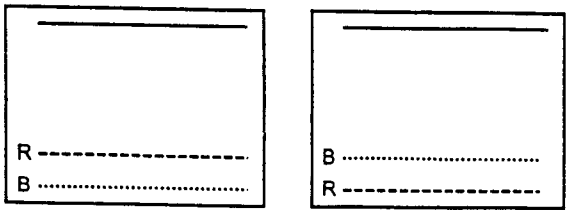
S/N : 1060709827001

Year - - - - - - - - - - - 1998
Week - - - - - - - - - 02
Unit Number - - - - - 0001

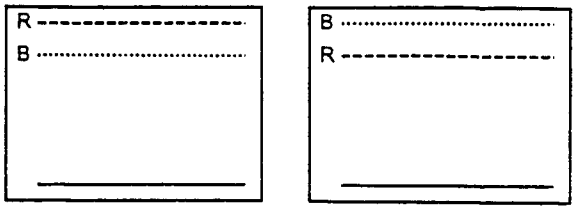

CRT CUT- OFF ADJUSTMENT
WARNING
Do not turn the screen VR after this adjustment.
Conditions
Signal : Turn off the R,G,B (sync signal only)
Adjust Menu : " 3) Adjust OTHER setting " at main menu
" Adjust VIDEO setting " at sub manu
H5 Set screen VR fully counterclockwise (Min).
H6 Set BRIGHTNESS to center point by using the OSD
H7 Set data value to " 30 " for R, G, B LOW LIGHT
H8 Turn screen VR until the raster appears with any one of three (R,G,B) colors
If Red appears in H8
If Green appears in H8
If Blue appears in H8
H9 Set Value to " FF " for < R. LOW LIGHT >
H9 Set Value to " FF " for < G. LOW LIGHT >
H9 Set Value to " FF " for < B. LOW LIGHT >
H10 Turn screen VR until the raster appears with any one of two (G or B) colors.
H10 Turn screen VR until the raster appears with any one of two (R or B) colors.
H10 Turn screen VR until the raster appears with any one of two (R or G) colors.
If Green appears in H10
If Blue appears in H10
If Red appears in H10
If Blue appears in H10
If Red appears in H10
If Green appears in H10
H11 Set Value to " FF " for < G. LOW LIGHT >
H11 Set Value to " FF " for < B. LOW LIGHT >
H11 Set Value to " FF " for < R. LOW LIGHT >
H11 Set Value to " FF " for < B. LOW LIGHT >
H11 Set Value to " FF " for < R. LOW LIGHT >
H11 Set Value to " FF " for < G. LOW LIGHT >
H12 Adjust Screen VR to " 0.50 " cd/m² for Blue raster
H12 Adjust Screen VR to " 3.51 " cd/m² for Green raster
H12 Adjust Screen VR to " 0.50 " cd/m² for Blue raster
H12 Adjust Screen VR to " 1.00 " cd/m² for Red raster
H12 Adjust Screen VR to " 3.51 " cd/m² for Green raster
H12 Adjust Screen VR to " 1.00 " cd/m² for Red raster
H13 Adjust < R. LOW LIGHT > < G. LOW LIGHT > to [x=0.281 y=0.311]
H13 Adjust < R. LOW LIGHT > < B. LOW LIGHT > to [x=0.281 y=0.311]
H13 Adjust < R. LOW LIGHT > < G. LOW LIGHT > to [x=0.281 y=0.311]
H13 Adjust < G. LOW LIGHT > < B. LOW LIGHT > to [x=0.281 y=0.311]
H13 Adjust < R. LOW LIGHT > < B. LOW LIGHT > to [x=0.281 y=0.311]
H13 Adjust < G. LOW LIGHT > < B. LOW LIGHT > to [x=0.281 y=0.311]
H14 Test Pattern : 16 gradation grayscale. Adjust screen VR so the 2nd level of gray appears slightly.

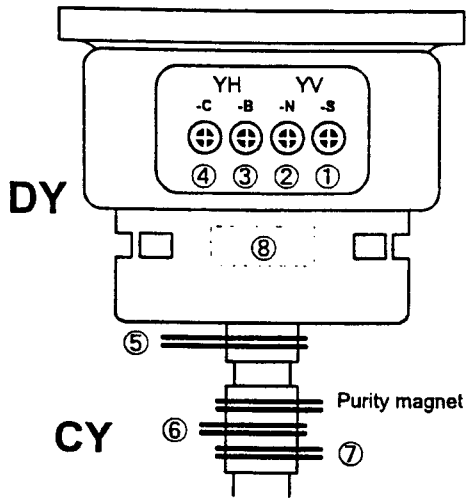
2. Adjustment Location for Purity and Convergence

① Differential VR YV-S

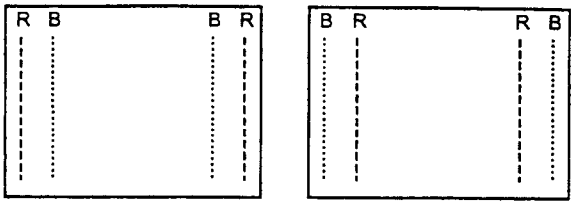


② Differential VR YV-N

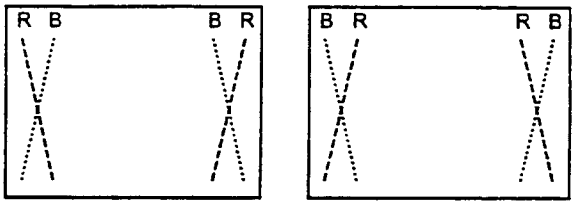




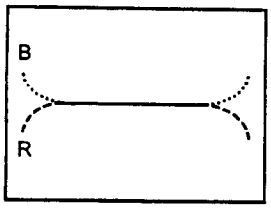
③ Differential VR YH-B



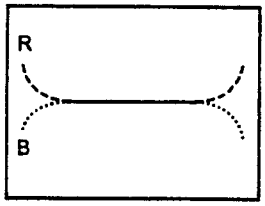
④ Differential VR YH-C



⑤ Four-pole magnet B

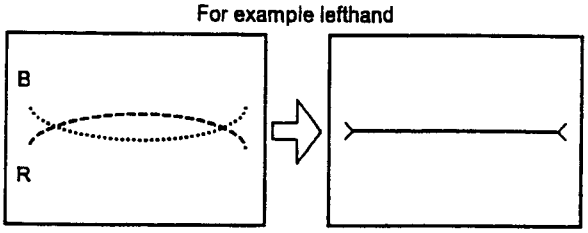


Beams are twisted lefthand



Beams are twisted righthand

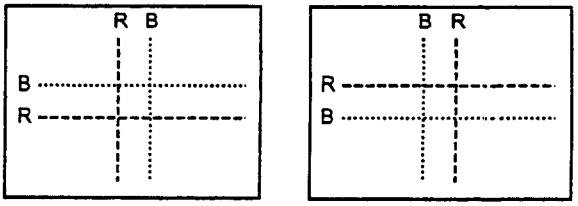
For example lefthand



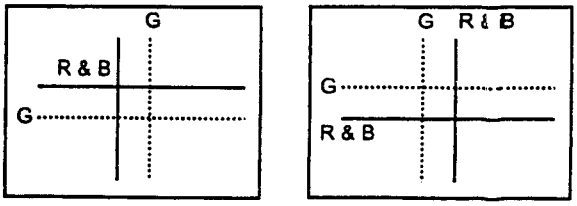
With four-pole magnet B⑤

With four-pole magnet A⑥

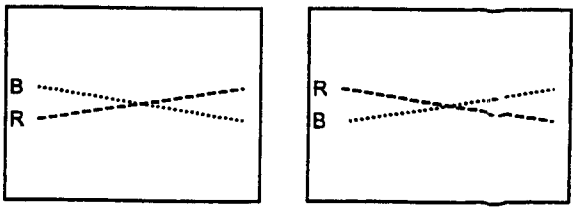
⑥ Four-pole magnet A



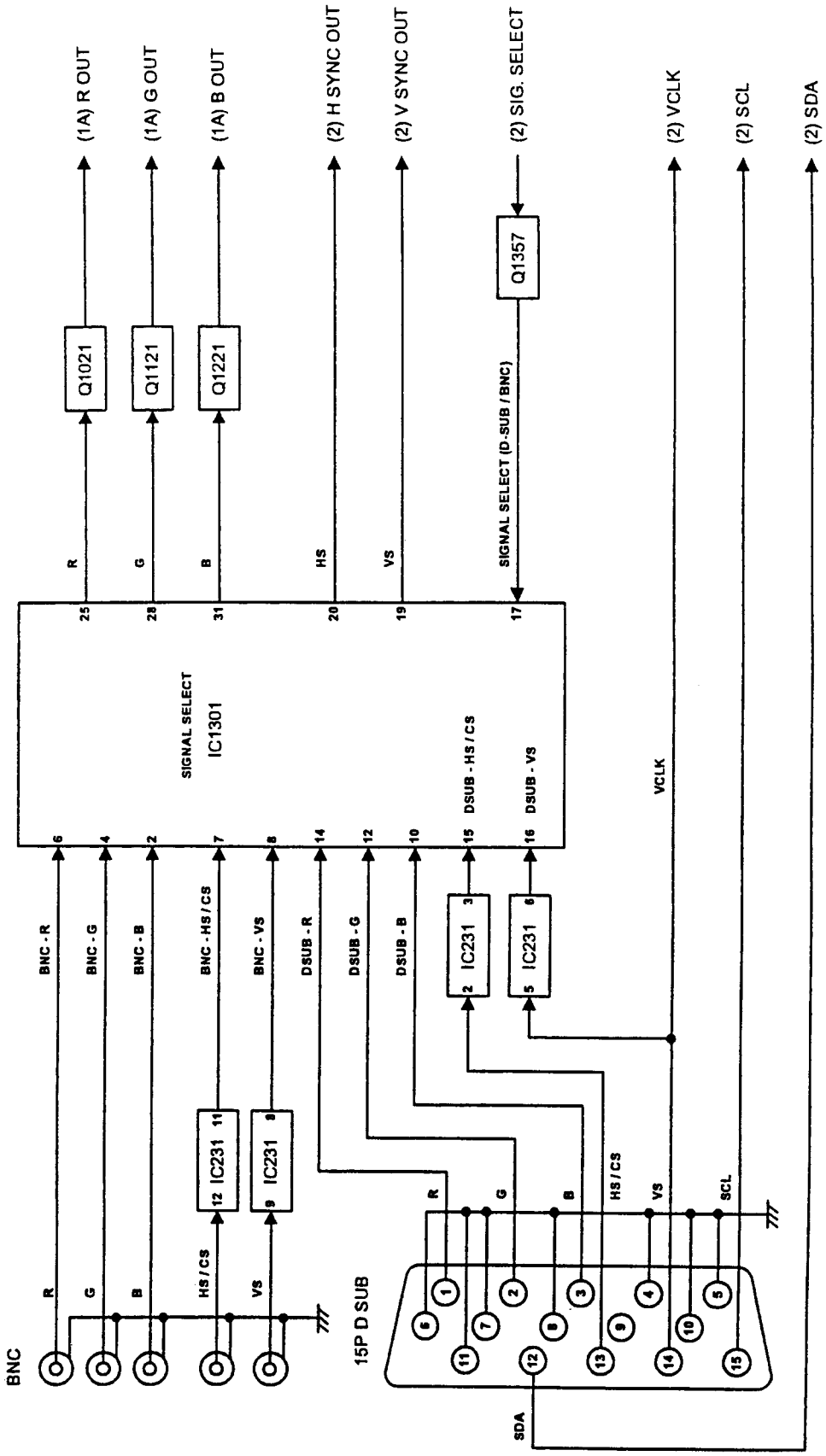
⑦ Six-pole magnet



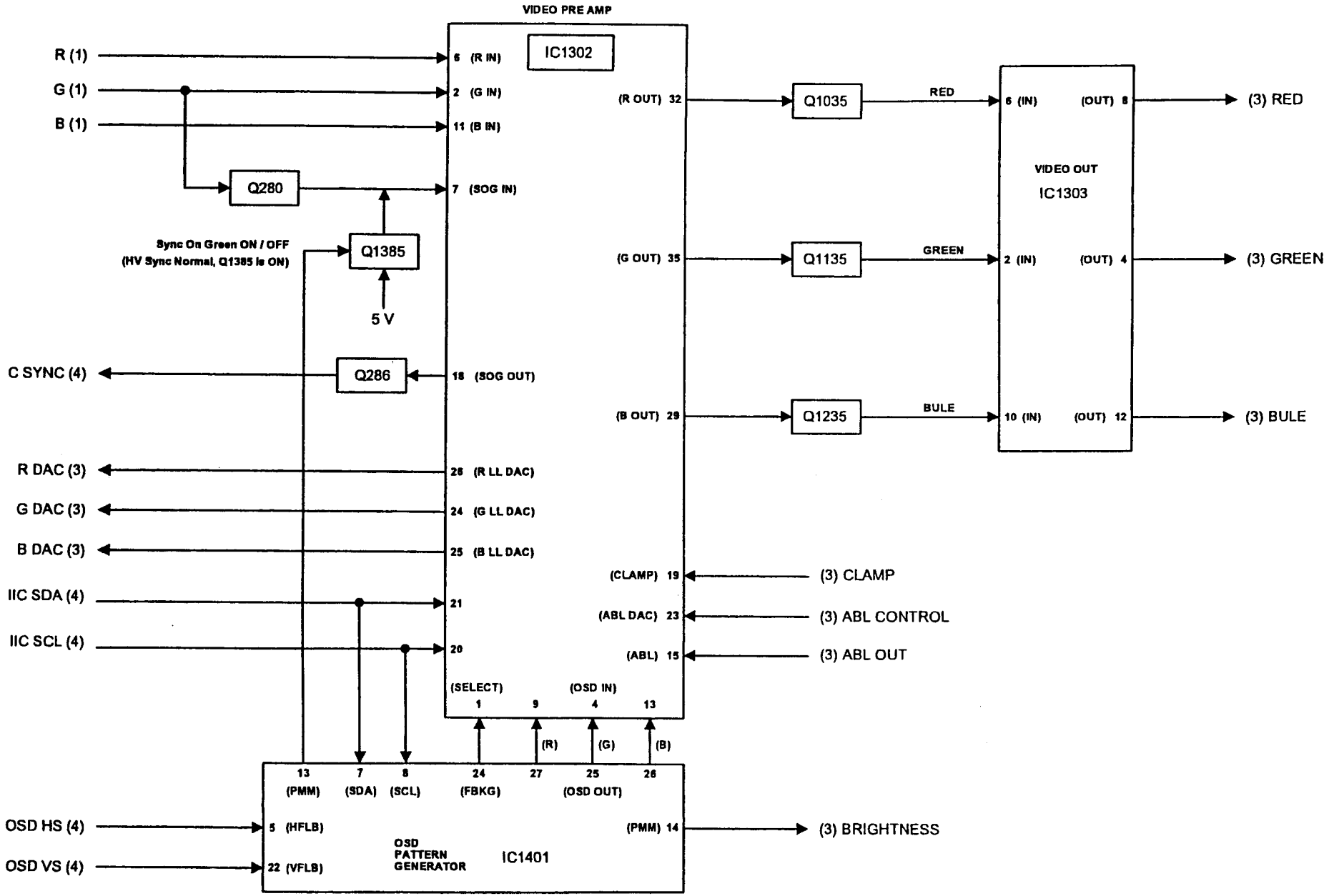
⑧ Differential Coil



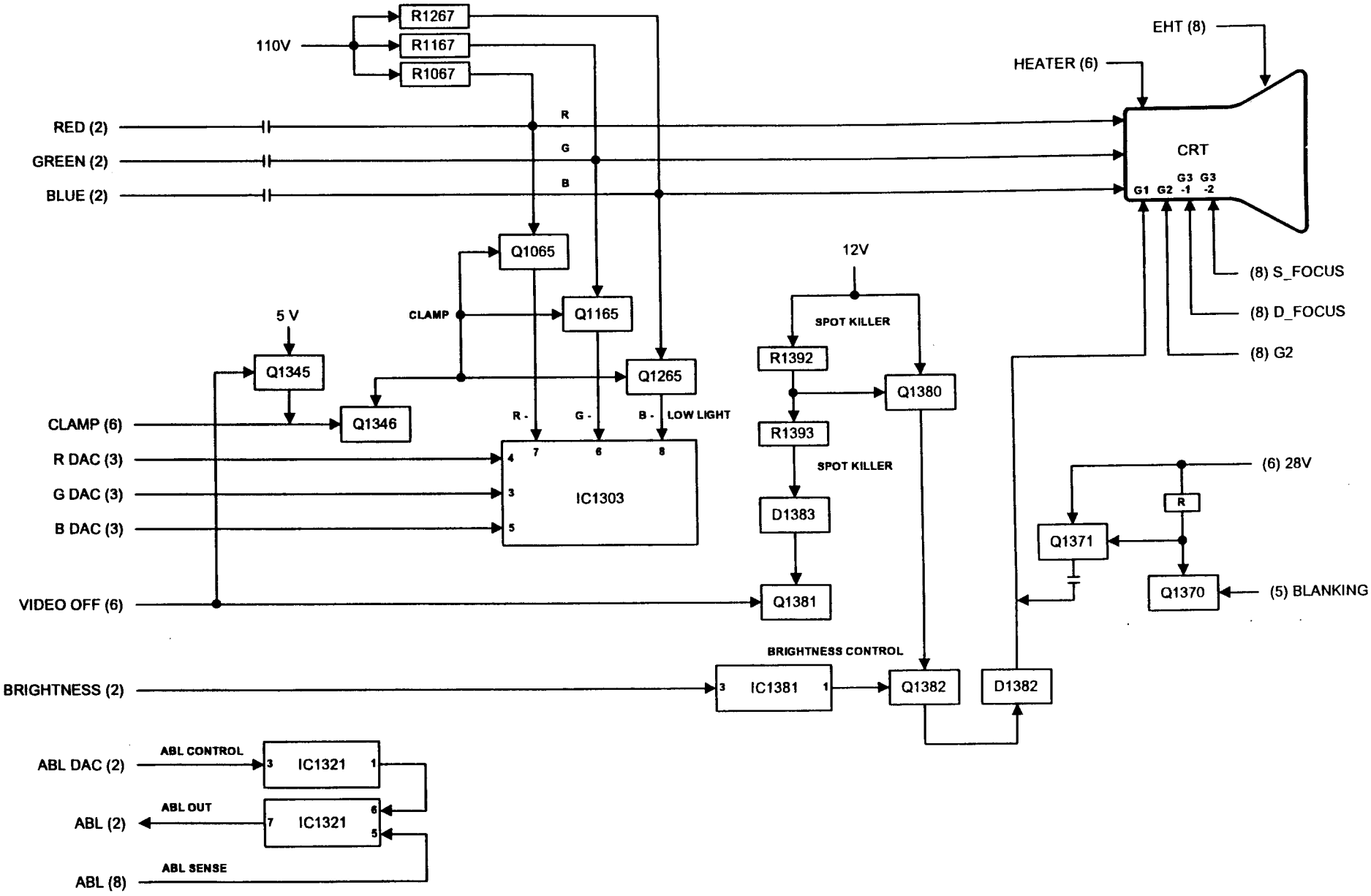
SHEET (1) / VIDEO AMP for HV10H



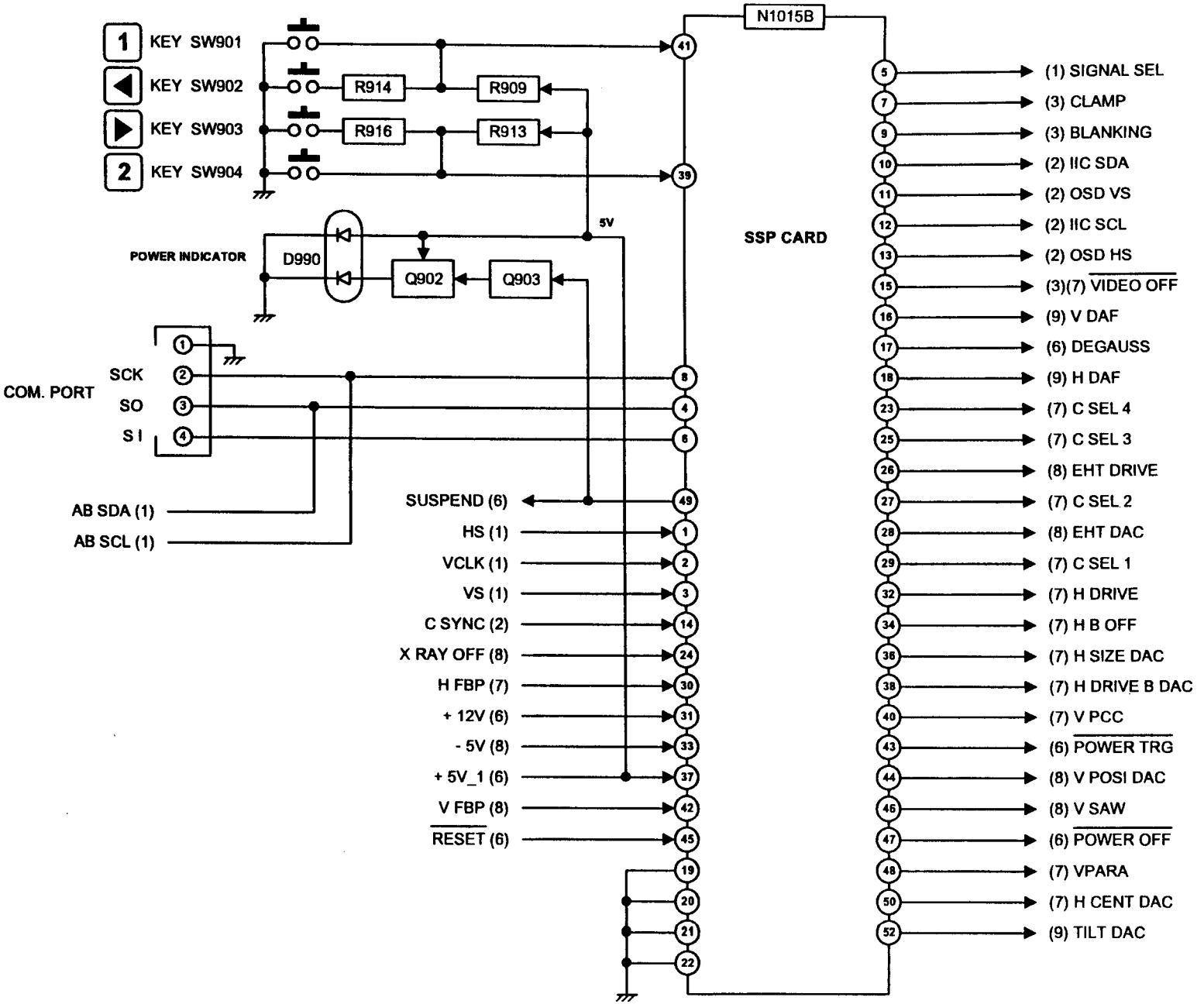
SHEET (2) / VIDEO OUT for HV10H



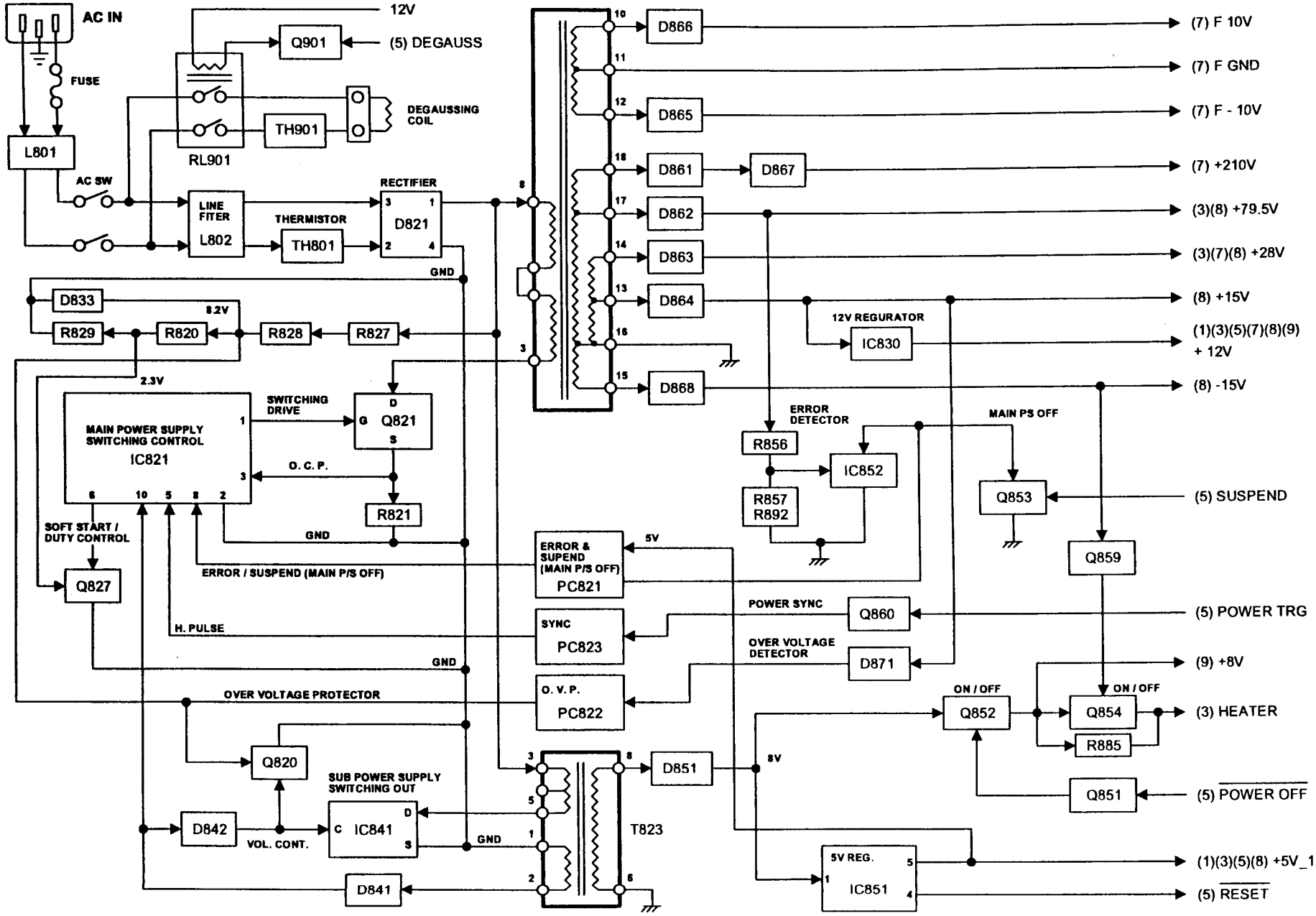
SHEET (3) / VIDEO OUT for HV10H



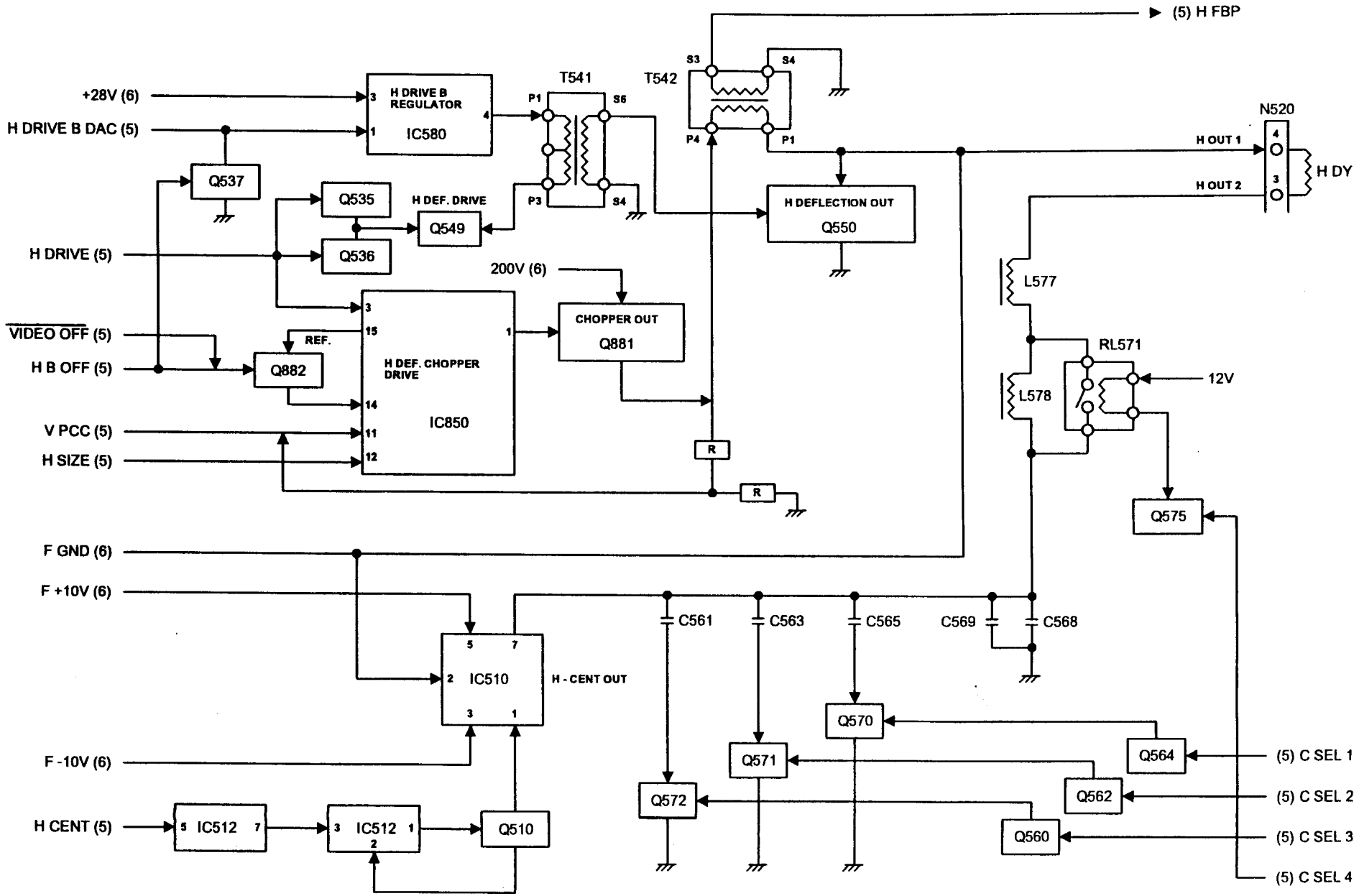
SHEET (4)(5) / SSP CARD for HV10H



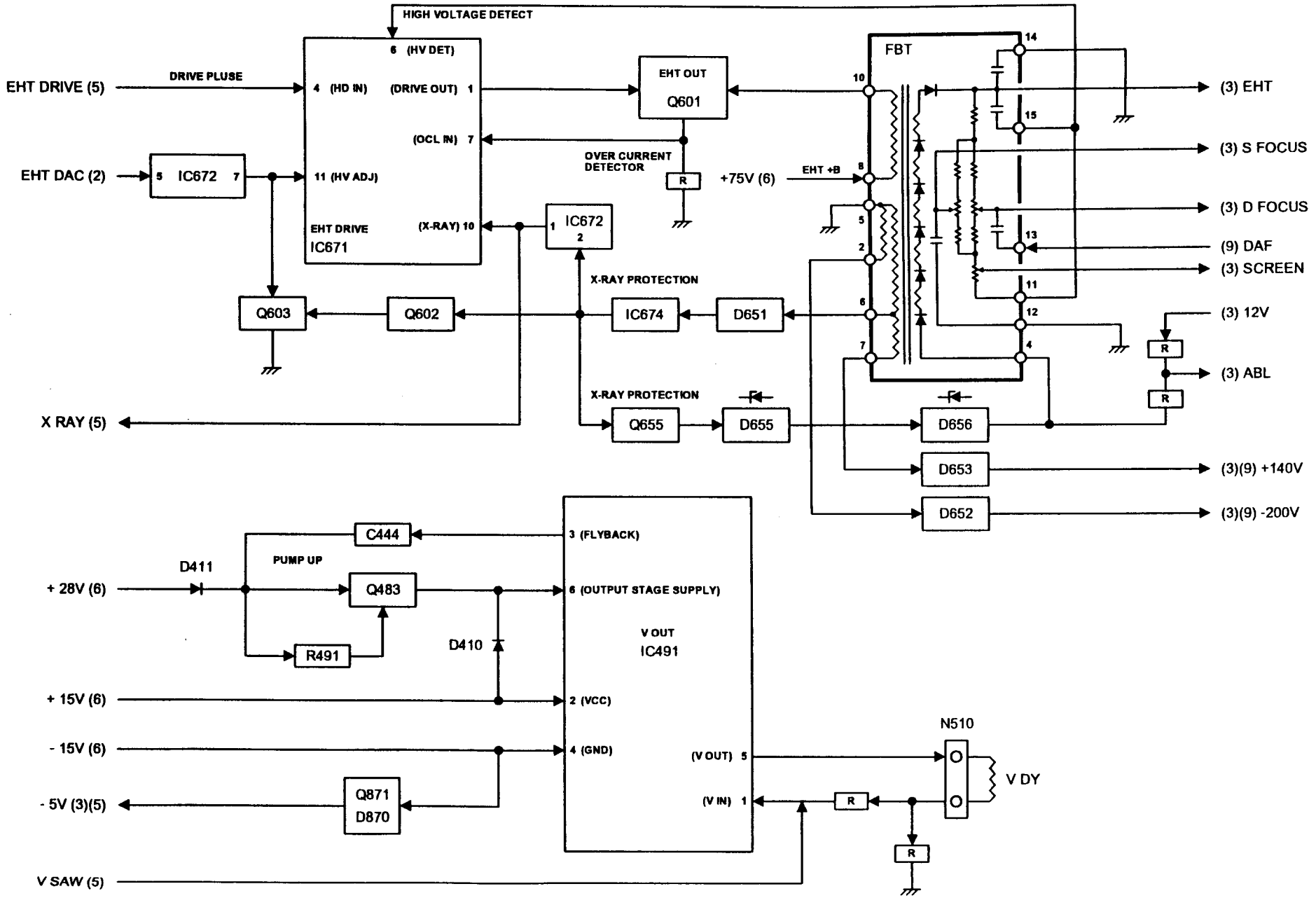
SHEET (6) / POWER SUPPLY for HV10H



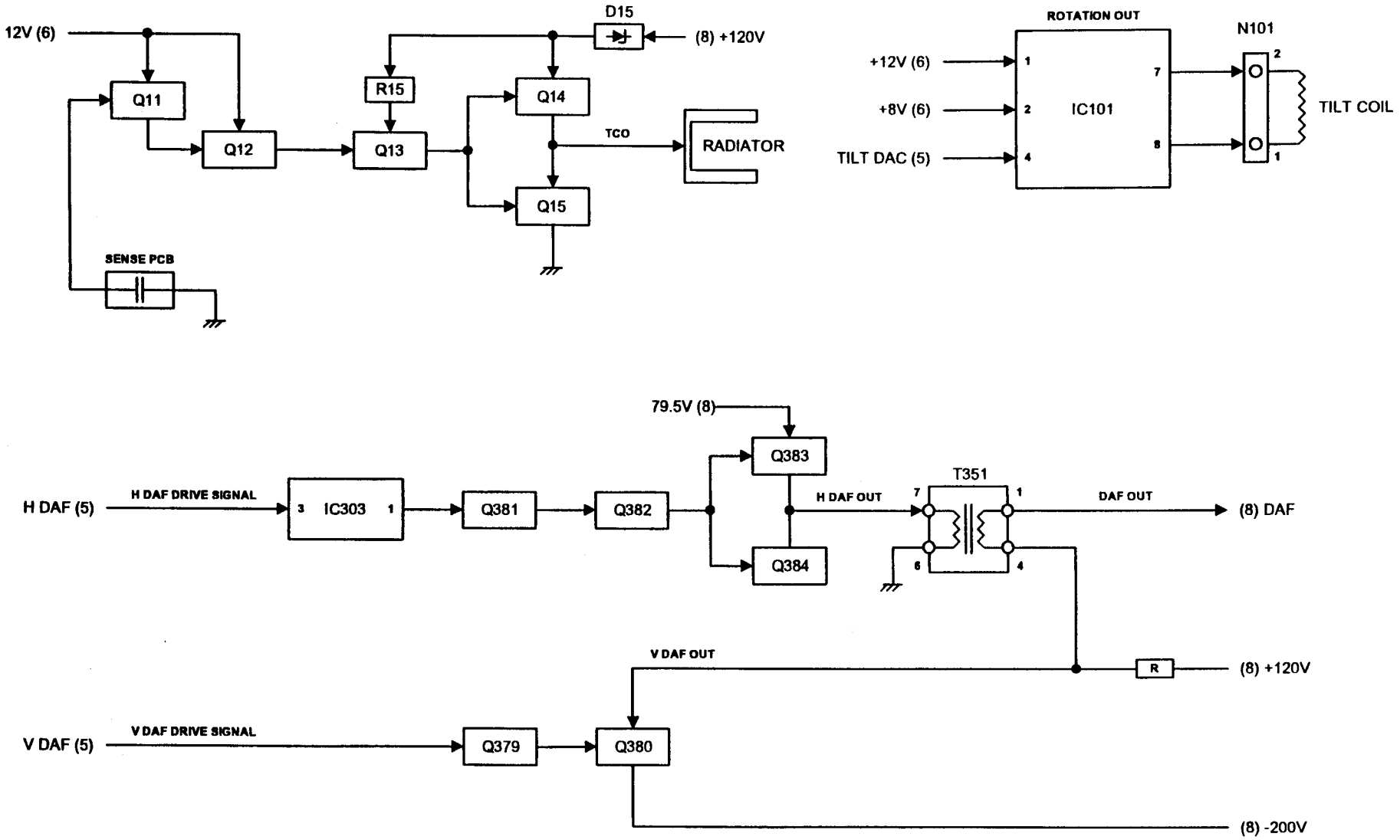
SHEET (7) / HORIZONTAL DEFLECTION for HV10H



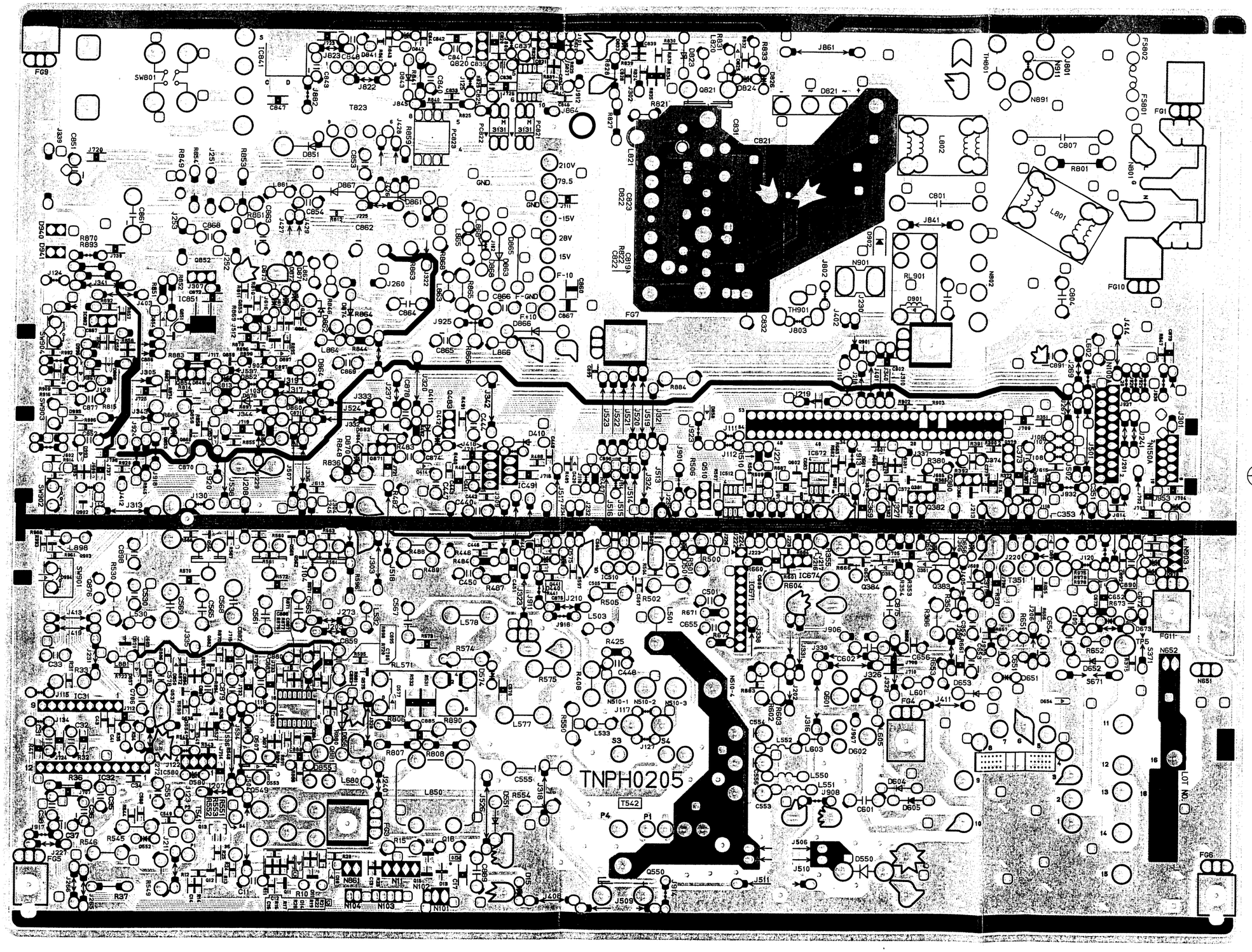
SHEET (8) / EHT OUT for HV10H



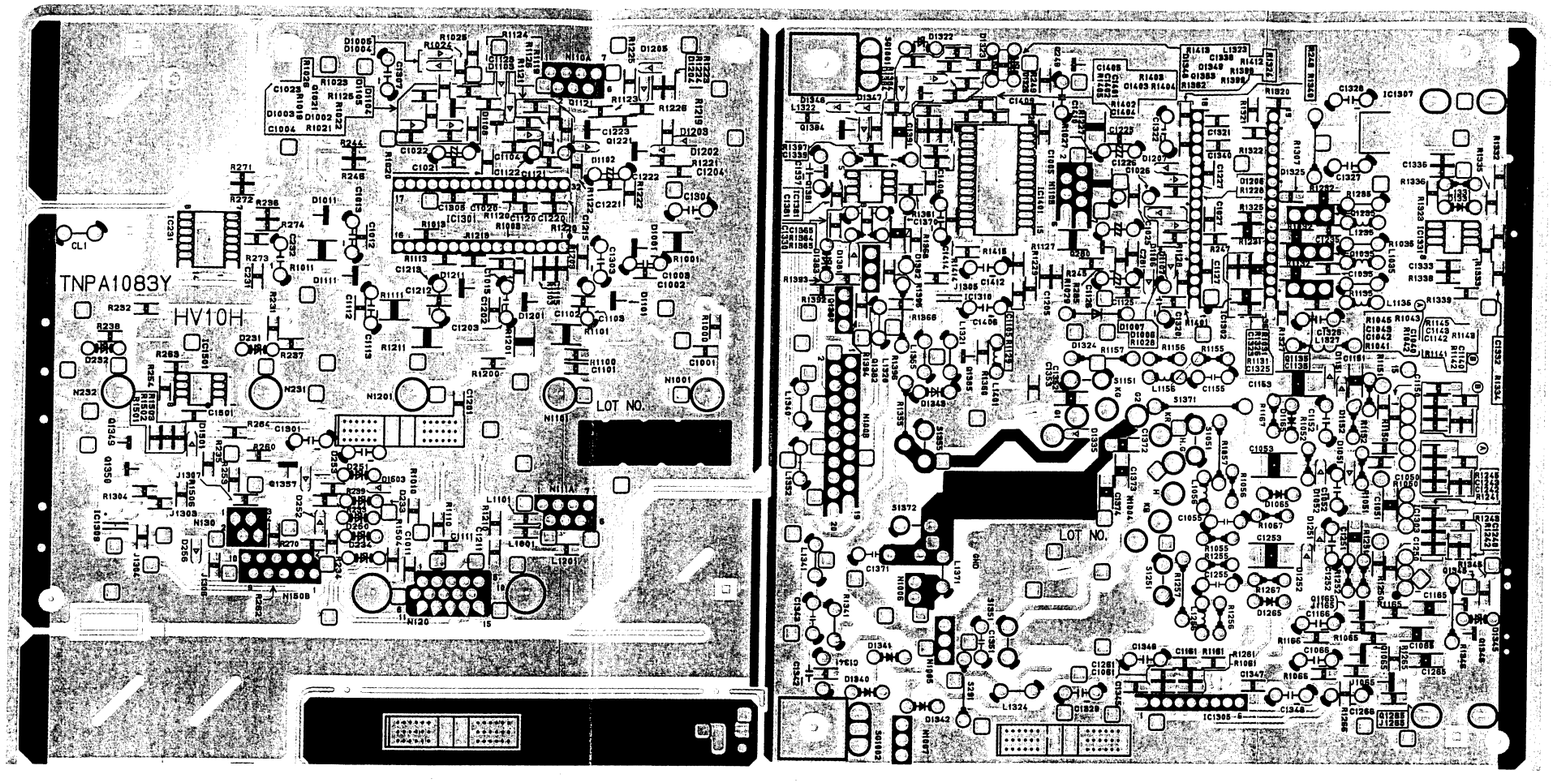
SHEET (9) DAF OUT / TILT CONTROL / TCO for HV10H



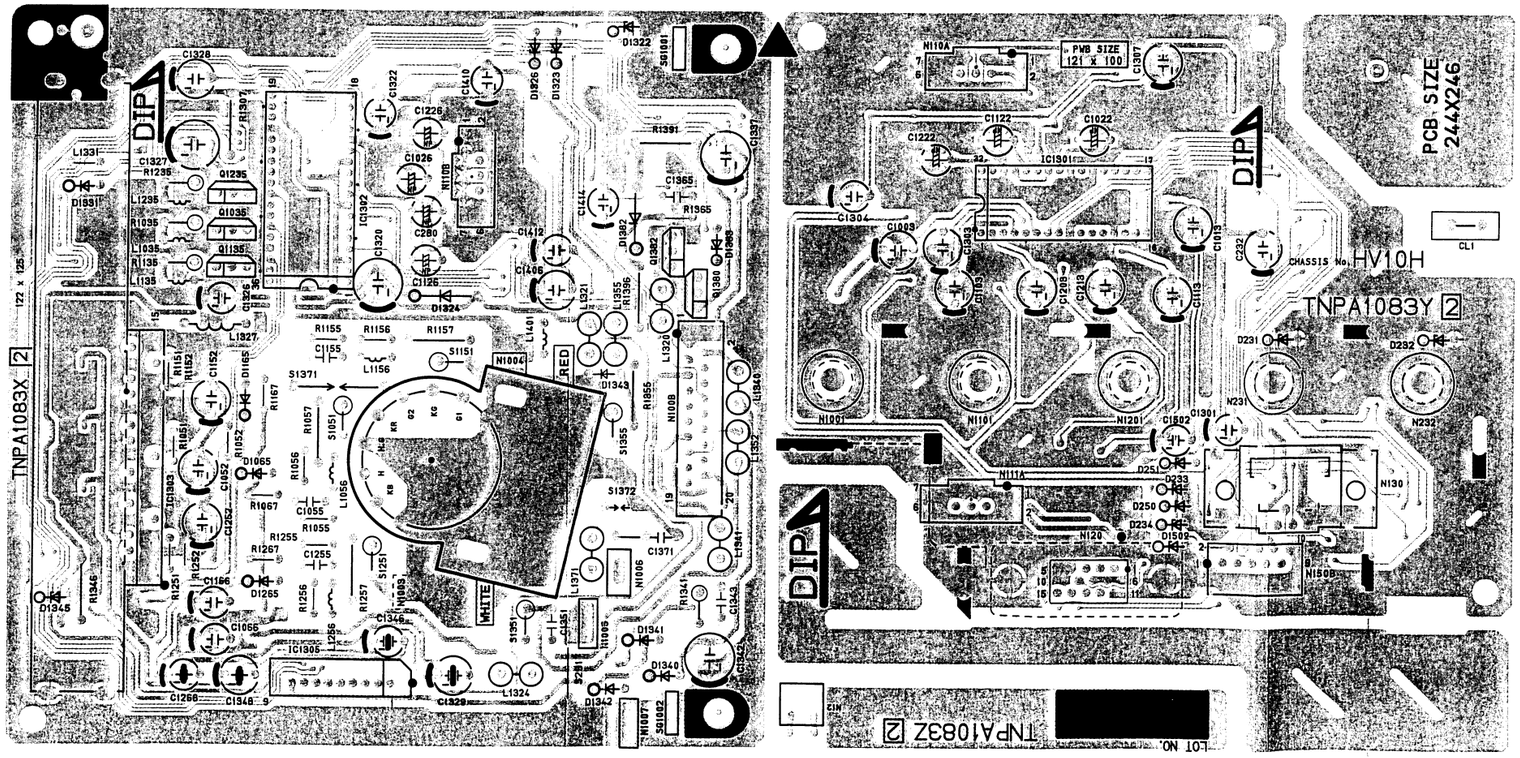
MAIN BOARD (Solder side)



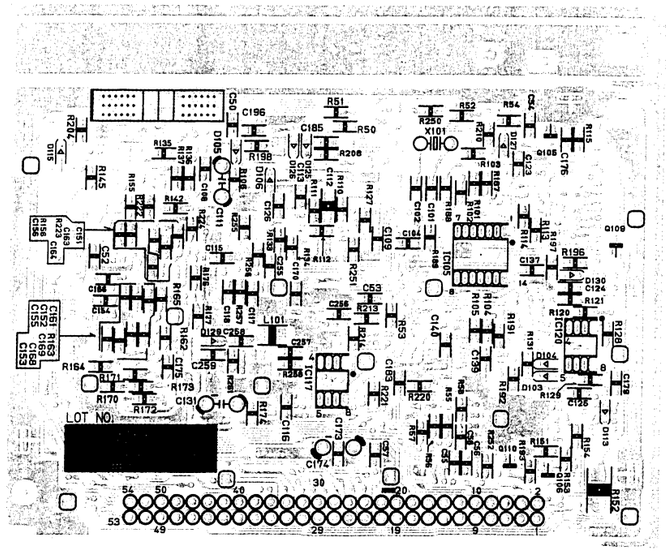
Video / I/F BOARD (Solder side)



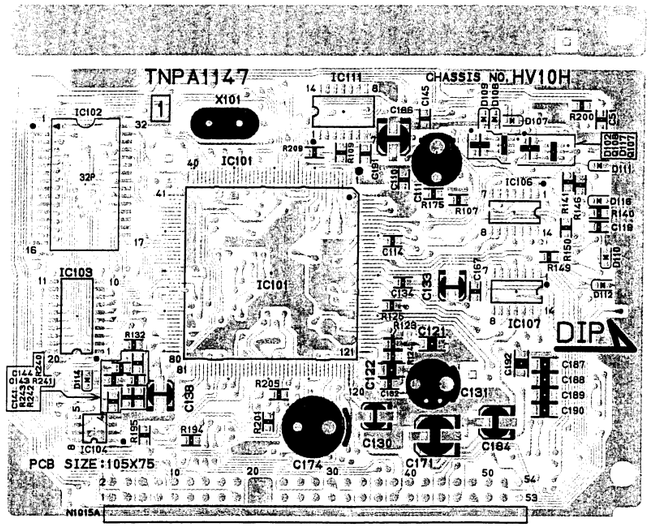
Video / I/F BOARD (Parts side)



SSP BOARD (Solder side)



SSP BOARD (Parts side)



SCHEMATIC DIAGRAM

IMPORTANT SAFETY NOTICE

The component identified by shading or international symbol ⚠ on the following schematic diagrams incorporate special features important for protection from X-Radiation, fire and electrical shock hazards. When servicing it is essential that only manufacturer's specified parts be used for those critical components.

NOTES :

1. RESISTOR

All resistors are carbon 1/4W resistor, unless otherwise noted by the following marks.
Unit of resistance is ohm (Ω), (K = 1,000, M = 1,000,000)

- ◯ : Non Flammable
- ⊠ : Metal Oxide
- □ : Wire Wound
- ⊗ : Fusible
- ⧄ : Flame Proof Rectangular
- △ : Solid
- ◎ : Metal (Precision and high stability)
- : Thermistor
- : Positive coefficient Thermistor

2. CAPACITOR

All capacitors are ceramic 50V capacitor, unless otherwise noted by the following marks.
Unit of capacitance is μF, unless otherwise noted.

- : Electrolytic
- Ⓣ : Tantalum
- NP : Bipolar
- Ⓢ : Polystyrene
- ⊗ : Temperature Compensation
- Ⓜ : Polyester
- Ⓜ : Metalized Polyester
- ⊠ : Polypropylene
- △ : Mica
- ◯ : Ceramic
- ◎ : Ceramic (SL)

3. COIL

Unit of inductance is μH, unless otherwise noted.

4. VOLTAGE MEASUREMENT

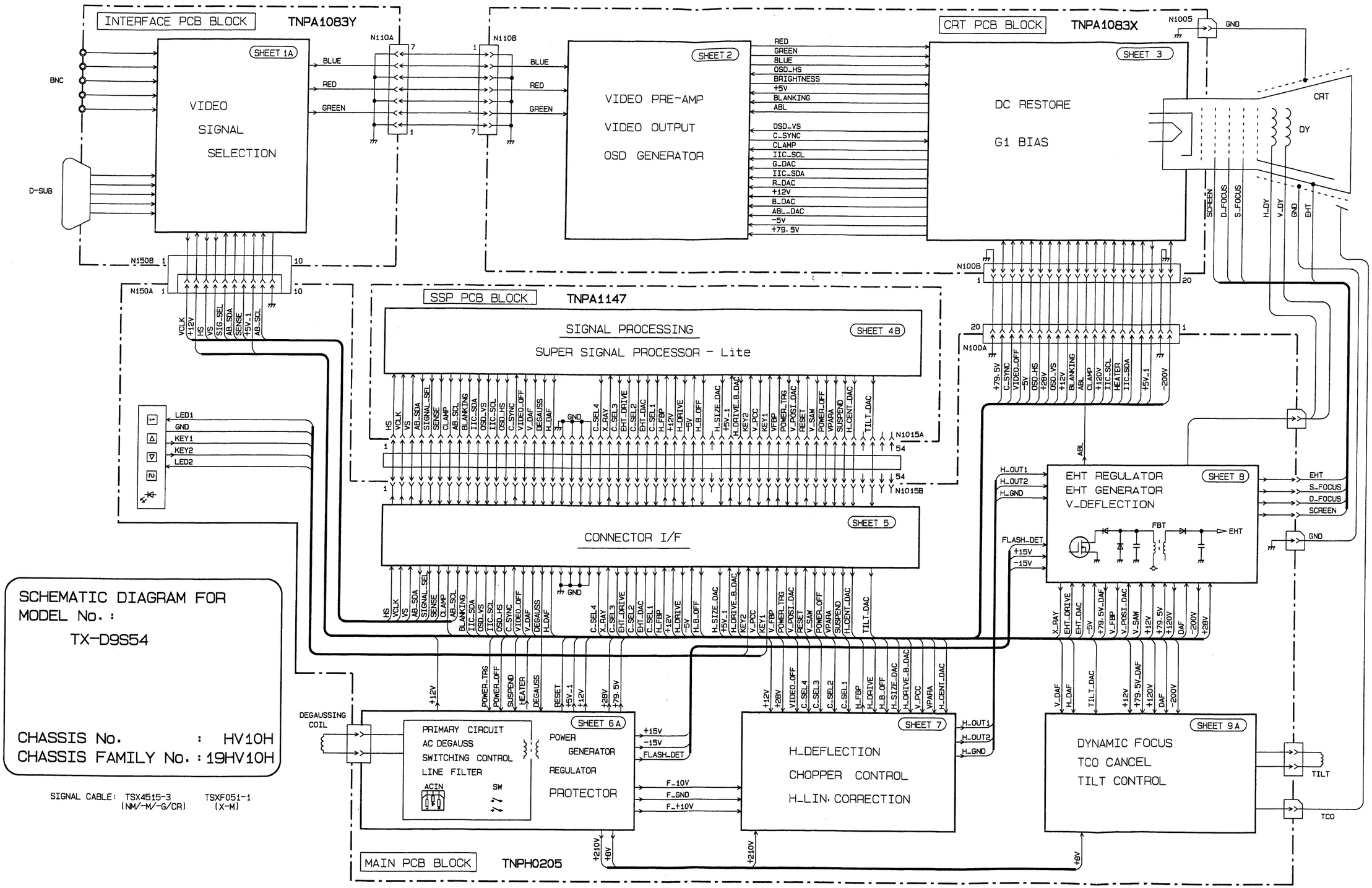
Voltage is measured by a digital meter receiving normal signal.

5. This schematic diagram is the letest at the time of printing and is subject to change without notice.

SERVICE NOTES :

This model has a section that does not share a common ground with the power supply section. The different sections are referred to as the HOT section and the COLD section in the precautions below.

1. Do not touch the HOT section and the COLD section at the same time. You may receive an electric shock.
2. Do not short the HOT section to the COLD section. This could blow the fuse or damage parts.
3. Never measure the HOT section and the COLD section at the same time when using tools such as oscilloscopes or multimeters.
4. Always unplug the unit before beginning any operation such as removing the chassis.

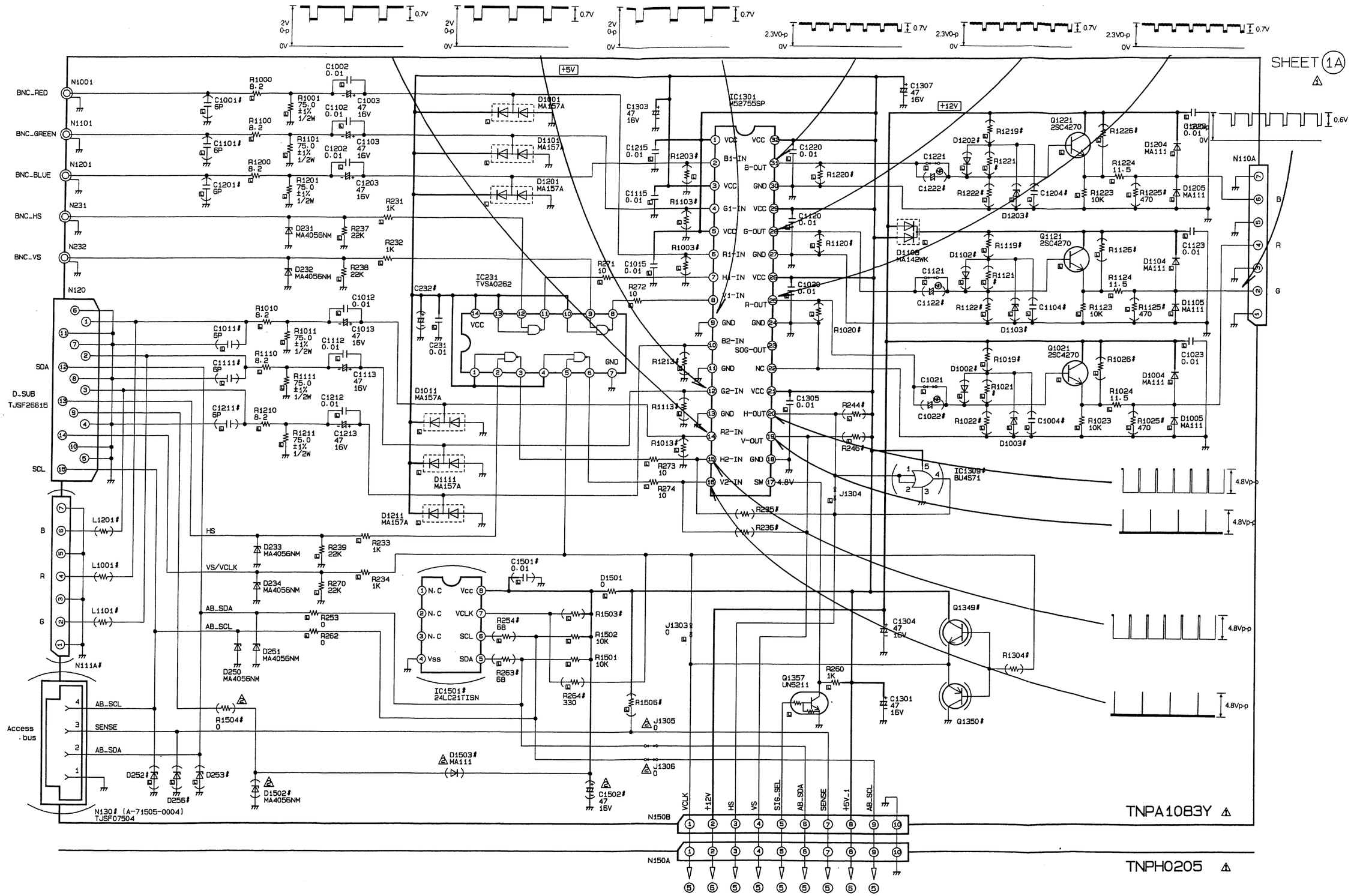


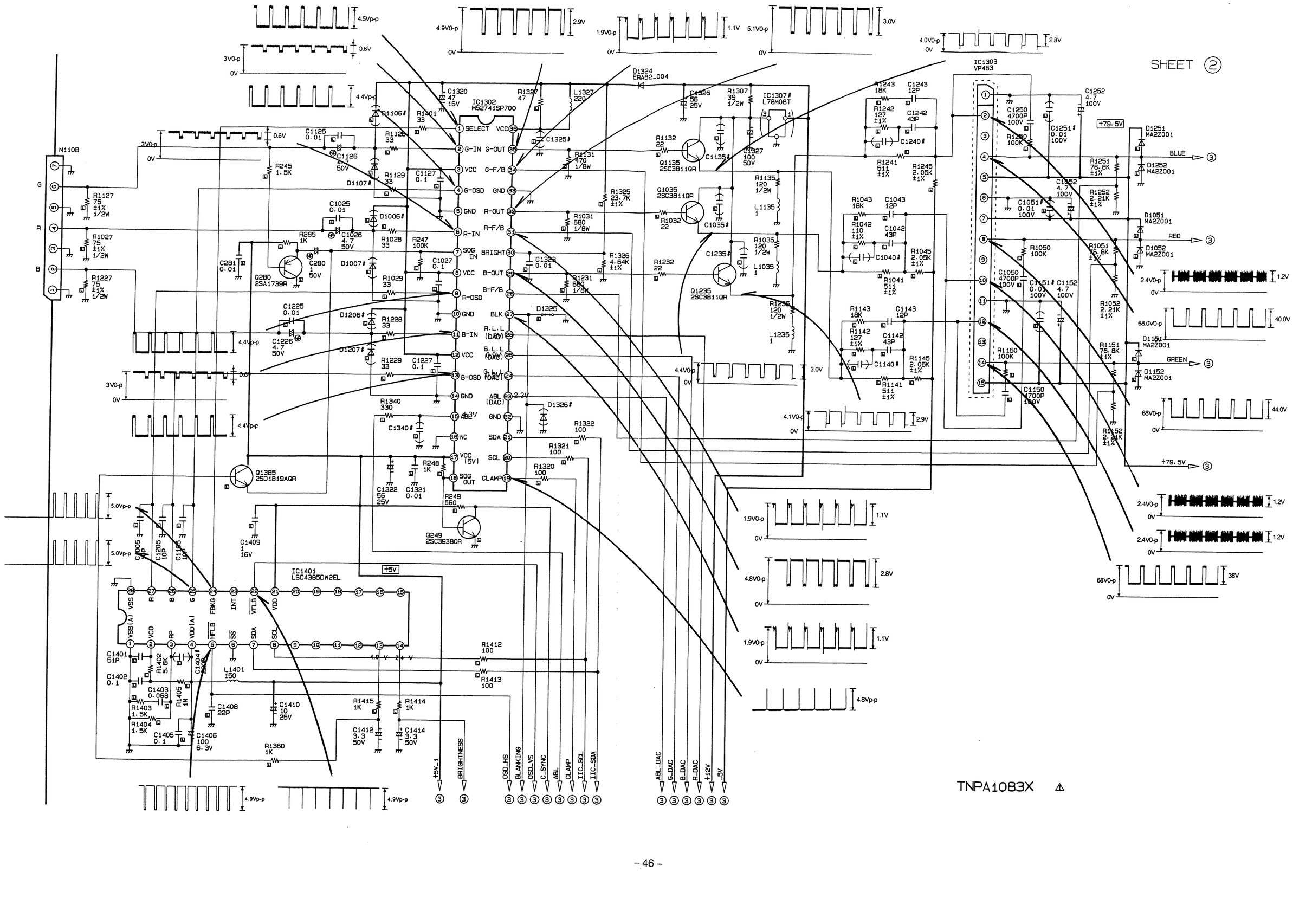
SCHEMATIC DIAGRAM FOR
MODEL No. :

TX-D9S54

CHASSIS No. : HV10H
CHASSIS FAMILY No. : 19HV10H

SIGNAL CABLE: TSX4515-3 (NM/-M/-G/CR) TSXF051-1 (X-M)


SHEET 1A
TNPA1083Y
TNPH0205
BNC_RED
BNC_GREEN
BNC_BLUE
BNC_HS
BNC_VS
D_SUB TJSF26615
SDA
SCL
Access .bus
N120
N111A#
N130# (A-71505-0004) TJSF07504
+5V
+12V
IC1301 M52755SP
IC231 TVSA0262
IC1501# 24LC21TISN
IC1309# BU4S71
N150B
N150A
VCLK
+12V
HS
VS
SIG-SEL
AB_SDA
SENSE
+5V-1
AB_SCL
0.7V
2V 0-p
0V
2.3V0-p
0.6V
4.8Vp-p


SHEET ②
N110B
IC1302 M52741SP700
IC1303 VP463
IC1307# L78M08T
IC1401 LSC4385DW2EL
D1324 ERA82-004
Q1135 2SC3B110QR
Q1035 2SC3B110QR
Q1235 2SC3B110QR
Q280 2SA1739R
Q1385 2SD1819AQR
Q249 2SC3938QR
+79.5V
+5V
BLUE
RED
GREEN
TNPA1083X

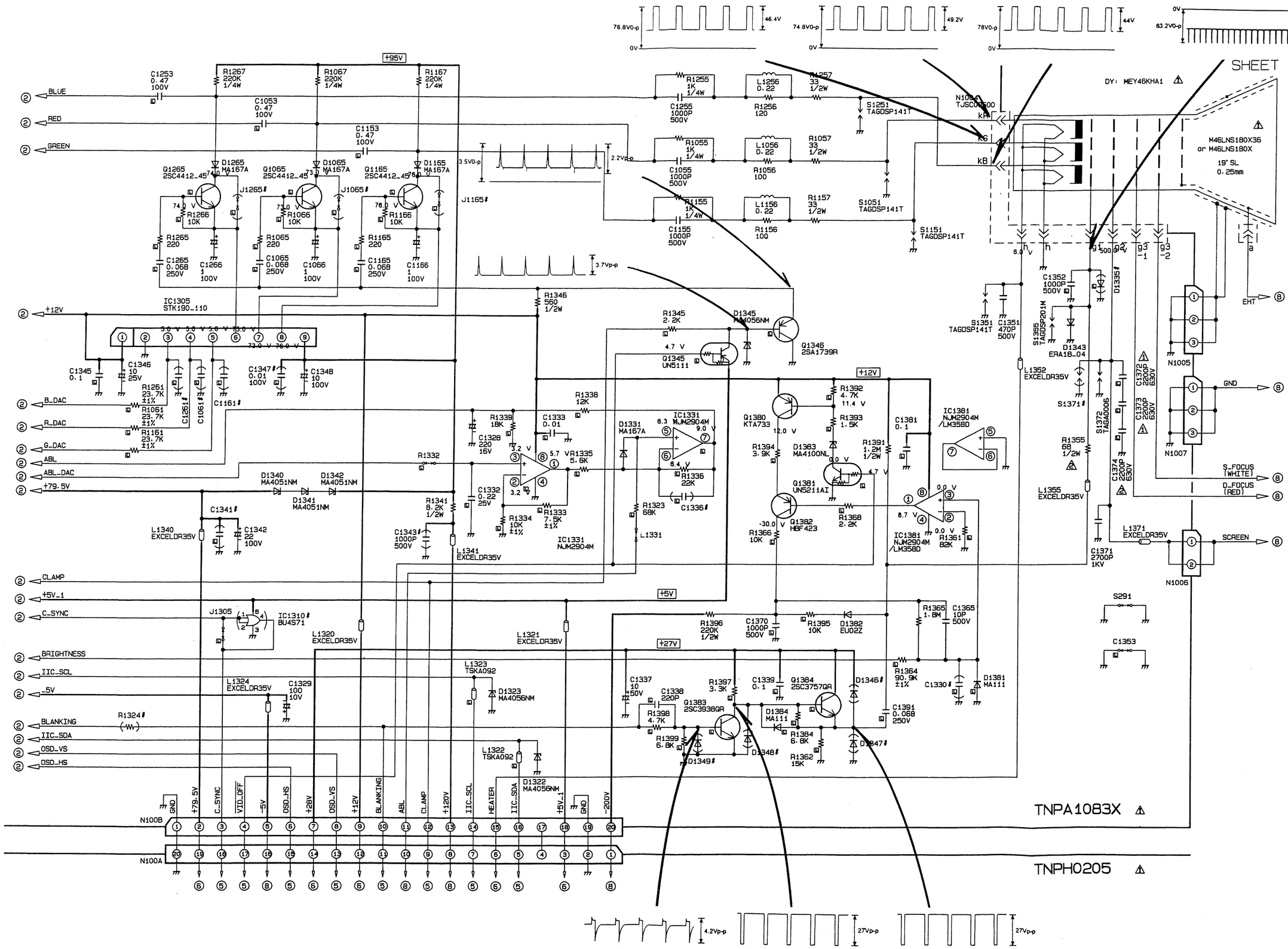
SHEET ③

DY: MEY46KHA1 ⚠

M46LNS180X36 or M46LNS180X 19" SL 0.25mm ⚠

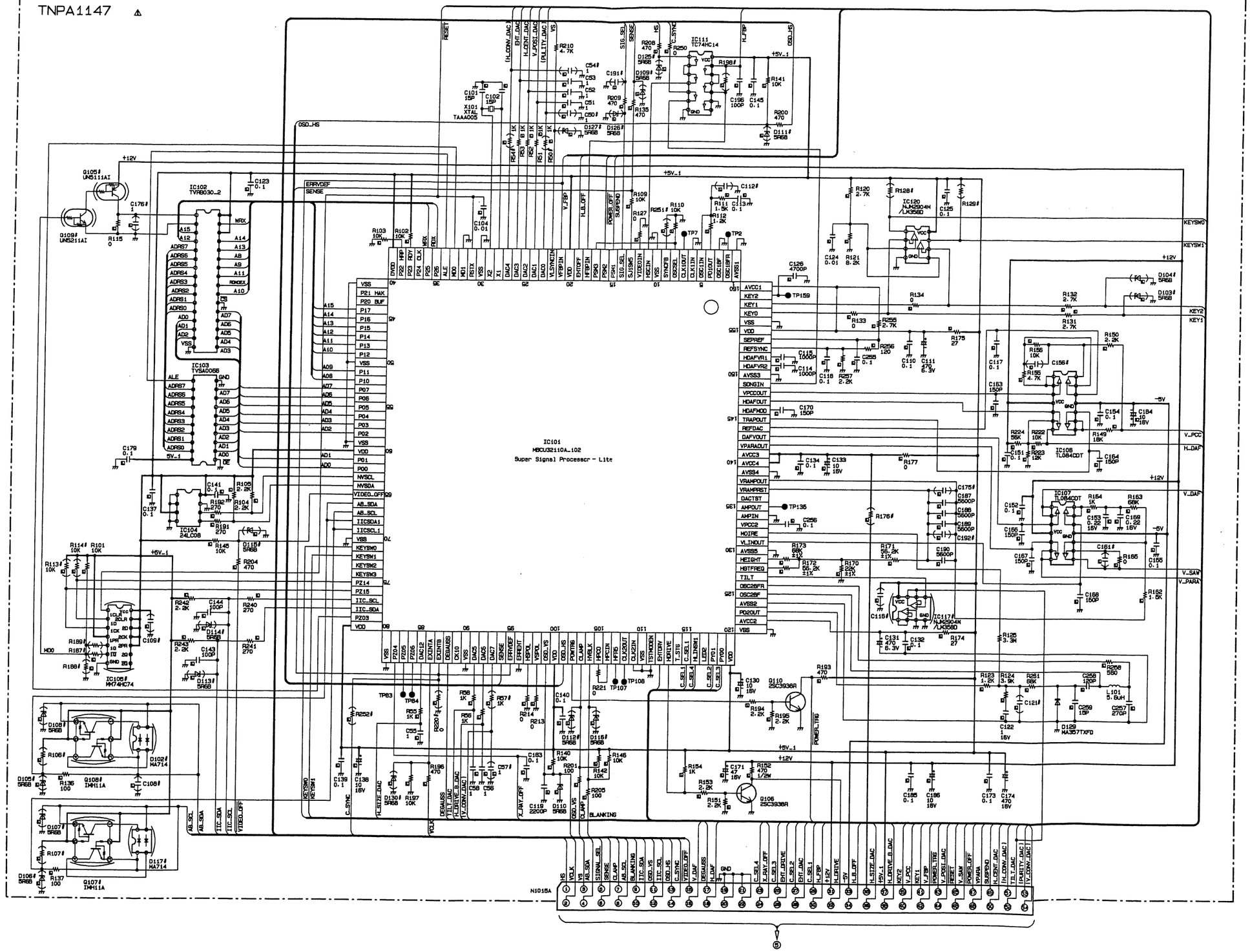
TNPA1083X ⚠

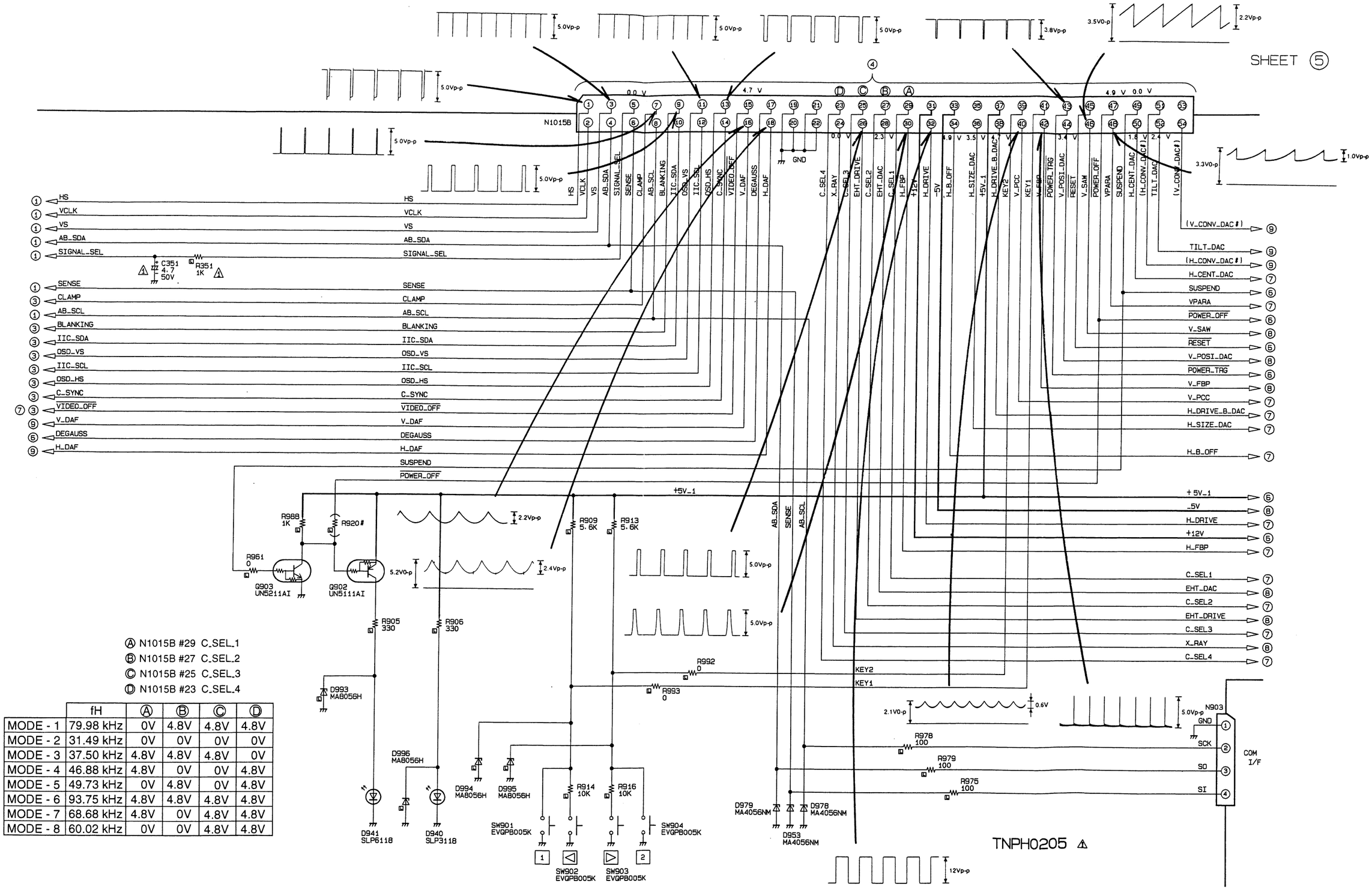
TNPH0205 ⚠



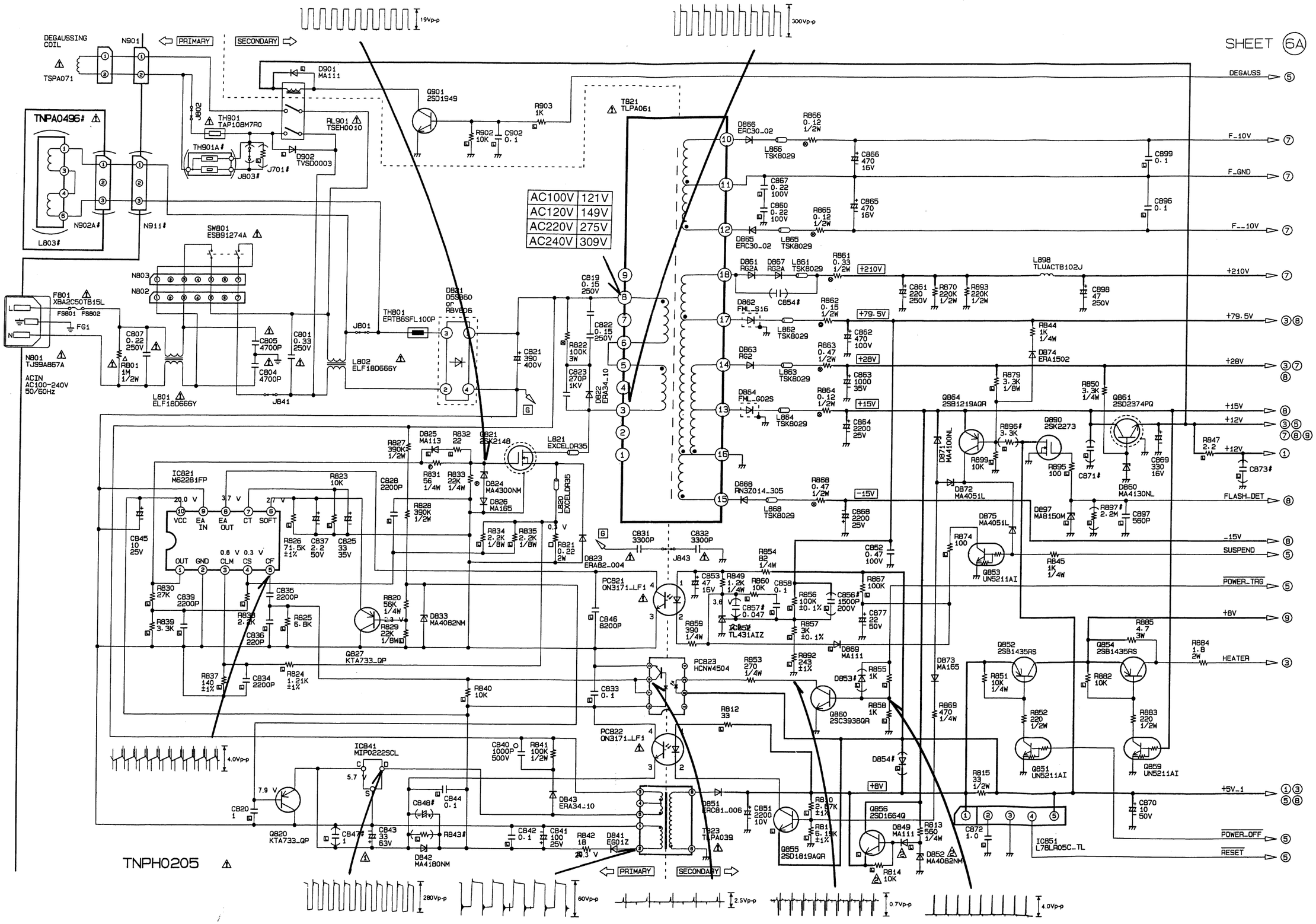
TNPA1147 ⚠

SHEET 4B





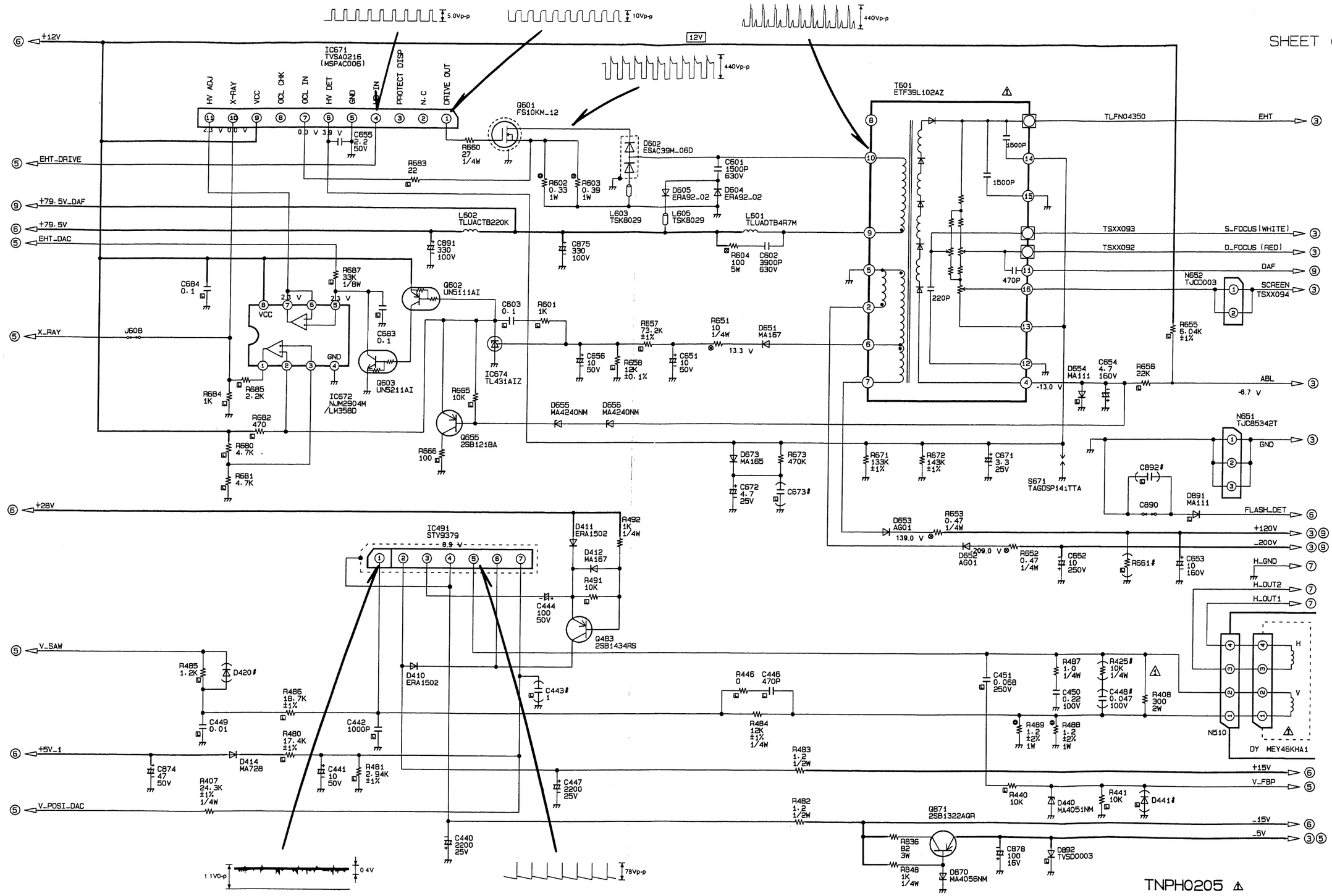
	fH	Ⓐ	Ⓑ	Ⓒ	Ⓓ
MODE - 1	79.98 kHz	0V	4.8V	4.8V	4.8V
MODE - 2	31.49 kHz	0V	0V	0V	0V
MODE - 3	37.50 kHz	4.8V	4.8V	4.8V	0V
MODE - 4	46.88 kHz	4.8V	0V	0V	4.8V
MODE - 5	49.73 kHz	0V	4.8V	0V	4.8V
MODE - 6	93.75 kHz	4.8V	4.8V	4.8V	4.8V
MODE - 7	68.68 kHz	4.8V	0V	4.8V	4.8V
MODE - 8	60.02 kHz	0V	0V	4.8V	4.8V


SHEET 6A
DEGAUSSING COIL
N901
PRIMARY
SECONDARY
TSPA071
TNPA0496#
N902A#
N911#
L803#
SWB01 ESB91274A
N803
N802
FB01 XBA2C50TB15L
FS801 FS802
FG1
N801 TJS9A867A
ACIN AC100-240V 50/60HZ
C807 0.22 250V
RB01 1M 1/2W
C805 4700P
C804 4700P
C801 0.33 250V
L801 ELF18D666Y
L802 ELF18D666Y
J841
J801
TH801 ERTB6SFL100P
J802
TH901 TAP108M7R0
TH901A#
J803#
J701#
RL901 TSEH0010
D901 MA111
D902 TVSD0003
Q901 2SD1949
R902 10K
C902 0.1
R903 1K
TB21 TLPA061
19Vp-p
300Vp-p
AC100V 121V
AC120V 149V
AC220V 275V
AC240V 309V
DB21 D5SB60 9F
RBV606
C819 0.15 250V
C822 0.15 250V
C823 270P 1KV
DB22 ERA34-10
C821 390 400V
G
R822 100K 3W
R827 390K 1/2W
D825 MA113
R832 22
Q821 2SK2148
L821 EXCELDR35
D824 MA4300NM
D826 MA165
R831 56 1/4W
R833 22K 1/4W
R834 2.2K 1/8W
R835 2.2K 1/8W
R821 0.22 2W
0.1 V
IC821 M62281FP
20.0 V
3.7 V
2.7 V
VCC EA IN EA OUT CT SOFT
OUT GND CLM CS CF
0.6 V 0.3 V
R823 10K
C828 2200P
R828 390K 1/2W
R826 71.5K ±1%
C837 2.2 50V
C825 33 35V
C845 10 25V
R830 27K
C839 2200P
R839 3.3K
C835 2200P
C836 220P
R825 6.8K
R820 56K 1/4W
2.3 V
R829 22K 1/8W
Q827 KTA733_GP
D833 MA4082NM
R837 140 ±1%
C834 2200P
R824 1.21K ±1%
C831 3300P
C832 3300P
J843
D823 ERA82-004
PC821 ON3171_LF1
C846 8200P
R840 10K
C833 0.1
PC823 HCNW4504
R853 270 1/4W
R812 33
PC822 ON3171_LF1
R854 82 1/4W
C853 47 16V
R849 1.2K 1/4W
R860 10K
C858 0.1
3.6 V
C857# 0.047
R856 100K ±0.1%
C856# 1500P 200V
R867 100K
C852 0.47 100V
C877 22 50V
R859 390 1/4W
R857 3K ±0.1%
IC852 TL431AIZ
R892 243 ±1%
D869 MA111
R855 1K
D853#
Q850 2SC3938QR
R858 1K
D854#
+8V
R810 2.87K ±1%
R811 6.19K ±1%
Q856 2SD1664Q
D849 MA111
R813 560 1/4W
R814 10K
D852 MA4082NM
C872 1.0
IC851 L78LR05C_TL
C870 10 50V
+5V_1
POWER_OFF
RESET
4.0Vp-p
ICB41 MIP0222SCL
C
D
5.7 V
S
7.9 V
C820 1
Q820 KTA733_GP
C848# C844 0.1
C847# 1
C843 33 63V
R843#
C840_O 1000P 500V
R841 100K 1/2W
C842 0.1
C841 100 25V
R842 18 1/4W
20.3 V
D841 EG01Z
D842 MA4180NM
D843 ERA34-10
T823 TLPA039
D851 ERC81-006
C851 2200 10V
Q855 2SD1819AQR
PRIMARY
SECONDARY
280Vp-p
60Vp-p
2.5Vp-p
0.7Vp-p
4.0Vp-p
TNPH0205
D856 ERC30-02
R866 0.12 1/2W
L866 TSK8029
C866 470 16V
C867 0.22 100V
C860 0.22 100V
R865 0.12 1/2W
C865 470 16V
D865 ERC30-02
L865 TSK8029
C899 0.1
C896 0.1
D861 RG2A
D867 RG2A
L861 TSK8029
R861 0.33 1/2W
+210V
C854#
L898 TLUACTB102J
C861 220 250V
R870 220K 1/2W
R893 220K 1/2W
C898 47 250V
D862 FML_S16
R862 0.15 1/2W
+79.5V
L862 TSK8029
C862 470 100V
R844 1K 1/4W
D874 ERA1502
D863 RG2
L863 TSK8029
R863 0.47 1/2W
+28V
C863 1000 35V
D864 FML_G02S
R864 0.12 1/2W
+15V
L864 TSK8029
C864 2200 25V
Q864 2SB1219AQR
R879 3.3K 1/8W
R850 3.3K 1/4W
Q861 2SD2374PQ
D871 MA4100NL
R896# 3.3K
Q890 2SK2273
R899 10K
R895 100
C871#
D860 MA4130NL
C869 330 16V
R847 2.2
C873#
D868 RN3Z014_305
R868 0.47 1/2W
-15V
L868 TSK8029
C868 2200 25V
D872 MA4051L
D875 MA4051L
R874 100
Q853 UN5211AI
R845 1K 1/4W
D897 MA8150M
R897# 2.2M
C897 560P
FLASH_DET
-15V
SUSPEND
POWER_TRG
+8V
R885 4.7 3W
R884 1.8 2W
HEATER
Q852 2SB1435RS
Q854 2SB1435RS
R851 10K 1/4W
R882 10K
R852 220 1/2W
R883 220 1/2W
D873 MA165
R869 470 1/4W
Q851 UN5211AI
Q859 UN5211AI
R815 33 1/2W
DEGAUSS
F_-10V
F_GND
F_-10V
+210V
+79.5V
+28V
+15V
+12V
+5V_1
DEGAUSS ⑤
F_-10V ⑦
F_GND ⑦
F_-10V ⑦
+210V ⑦
+79.5V ③⑧
+28V ③⑦⑧
+15V ⑧
+12V ③⑤⑦⑧⑨
+5V_1 ①③⑤⑧
FLASH_DET ⑧
-15V ⑧
SUSPEND ⑤
POWER_TRG ⑤
+8V ⑨
HEATER ③
POWER_OFF ⑤
RESET ⑤

	fH	Value
MODE - 1	79.98 kHz	119.7V
MODE - 2	31.49 kHz	47.2V
MODE - 3	37.50 kHz	57.7V
MODE - 4	46.88 kHz	69.7V
MODE - 5	49.73 kHz	76.0V
MODE - 6	93.75 kHz	142.1V
MODE - 7	68.68 kHz	100.3V
MODE - 8	60.02 kHz	87.9V

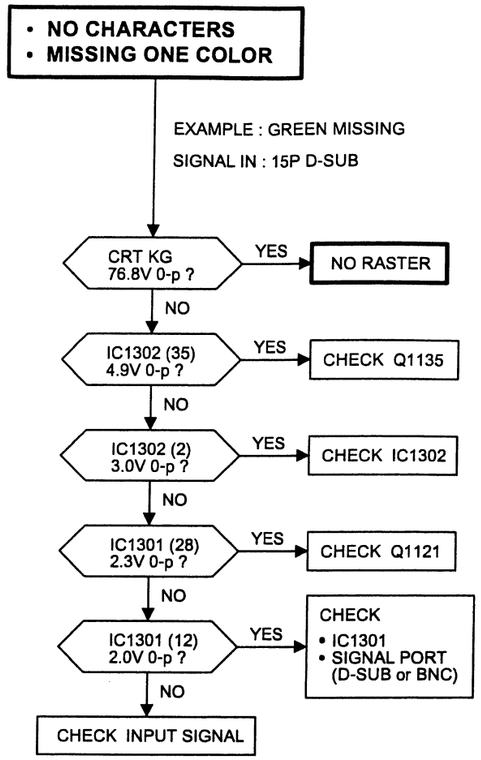
SHEET ⑦

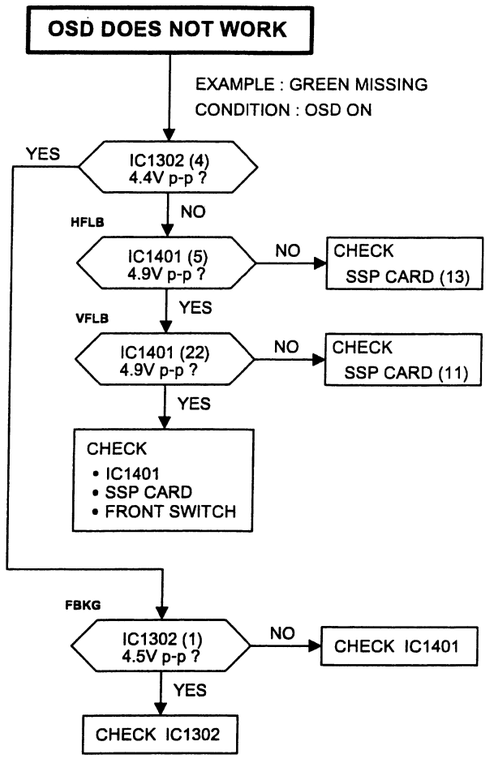
TNPH0205 ⚠

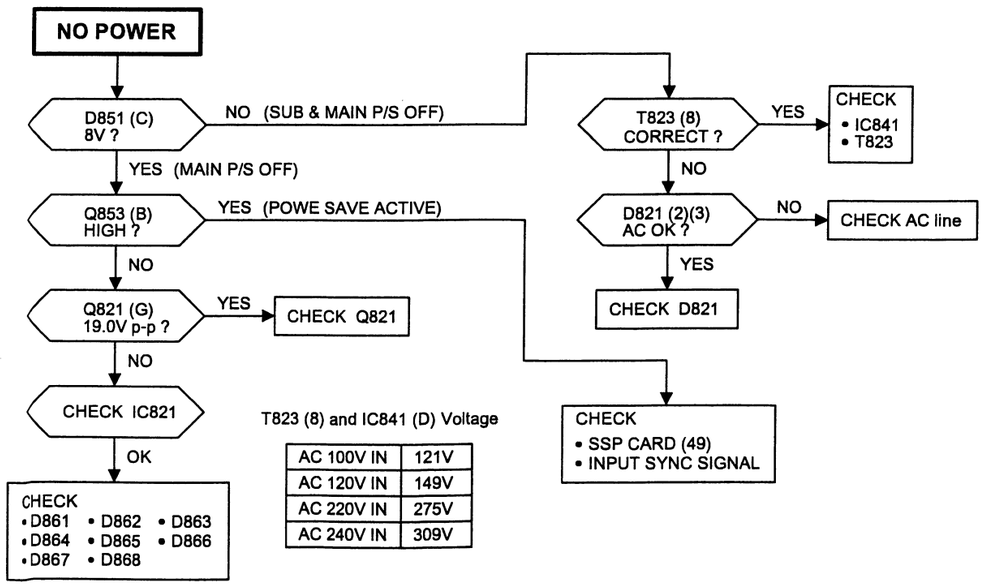

+12V
EHT_DRIVE
+79.5V_DAF
+79.5V
EHT_DAC
X_RAY
J608
+28V
V_SAW
+5V_1
V_POSI_DAC
IC671 TVSA0216 (MSPAC006)
HV ADJ
X-RAY
VCC
OCL CHK
OCL IN
HV DET
GND
H-IN
PROTECT DISP
N.C
DRIVE OUT
5.0Vp-p
10Vp-p
440Vp-p
12V
Q601 FS10KM_12
R660 27 1/4W
R683 22
R602 0.33 1W
R603 0.39 1W
C655 2.2 50V
D602 ESAC39M_06D
D605 ERA92_02
D604 ERA92_02
L603 TSK8029
L605 TSK8029
L601 TLUADTB4R7M
L602 TLUACTB220K
C601 1500P 630V
C875 330 100V
C891 330 100V
R604 100 5W
C602 3900P 630V
T601 ETF39L102AZ
TLFN04350
EHT
1500P
TSXX093
S_FOCUS (WHITE)
TSXX092
D_FOCUS (RED)
DAF
470P
220P
N652 TJC0003
SCREEN
TSXX094
R655 6.04K ±1%
C664 0.1
R687 33K 1/8W
Q602 UN5111AI
C603 0.1
R601 1K
C683 0.1
Q603 UN5211AI
IC672 NJM2904M /LM358D
R684 1K
R685 2.2K
R682 470
R680 4.7K
R681 4.7K
IC674 TL431AIZ
R657 73.2K ±1%
R658 12K ±0.1%
R651 10 1/4W
D651 MA167
C656 10 50V
C651 10 50V
13.3 V
D655 MA4240NM
D656 MA4240NM
R665 10K
Q655 2SB1218A
R666 100
D654 MA111
C654 4.7 160V
R656 22K
-13.0 V
ABL
-6.7 V
N651 TJC85342T
GND
C892#
C890
D891 MA111
FLASH_DET
D673 MA165
R673 470K
C672 4.7 25V
C673#
R671 133K ±1%
R672 143K ±1%
C671 3.3 25V
S671 TAGDSP141TTA
D653 AG01
R653 0.47 1/4W
139.0 V
D652 AG01
209.0 V
R652 0.47 1/4W
C652 10 250V
R661#
C653 10 160V
+120V
-200V
H_GND
H_OUT2
H_OUT1
H
V
N510
DY MEY46KHA1
IC491 STV9379
8.9 V
D411 ERA1502
D412 MA167
R491 10K
R492 1K 1/4W
C444 100 50V
Q483 2SB1434RS
D410 ERA1502
C443# 1
C440 2200 25V
C447 2200 25V
R485 1.2K
D420#
R486 18.7K ±1%
C449 0.01
C442 1000P
R480 17.4K ±1%
D414 MA728
C874 47 50V
R407 24.3K ±1% 1/4W
C441 10 50V
R481 2.94K ±1%
1.1V0-p
0.4V
78Vp-p
R446 0
C445 470P
R484 12K ±1% 1/4W
R483 1.2 1/2W
R482 1.2 1/2W
C451 0.068 250V
R487 1.0 1/4W
C450 0.22 100V
R425# 10K 1/4W
C448# 0.047 100V
R408 300 2W
R489 1.2 ±2% 1W
R488 1.2 ±2% 1W
R440 10K
D440 MA4051NM
R441 10K
D441#
+15V
V_FBP
-15V
-5V
Q871 2SB1322AQR
R836 82 3W
R848 1K 1/4W
D870 MA4056NM
C878 100 16V
D892 TVSD0003
TNPH0205 ⚠

+8V
+12V
C33#
IC31 AN5768
R33 10 1W
C41# 0.1
C43#
0.0 V
R31 1K
R32 2.7 1/8W
1.9 V
4.2 V
C31 4.7 50V
C32 4.7 50V
TILT_DAC
H_DAF
R41# 1/8W
IC32# AN5769
R34# 10 1/4W
R35# 10 1/4W
C34# 0.1
N101
TILT COIL (W/DY)
N102#
(V_CONV_DAC #)
(H_CONV_DAC #)
N103#
R36# 22 1/2W
C35#
C36#
R37# 33 1/2W
C37#
C38#
V_CONV
H_CONV
N104#
(H/V CONV. COIL)
+12V
+120V
D15 MA4220NH
C14 0.1
R26 33K
D14 MA111
D11 MA153A
R10 100 1/4W
Q11 2SK1848
5.2 V
R19 47K ±1%
R21 560K
R22 0
D10 MAB150M
R20 47K ±1%
C11 0.33
4.1 V
R12 470K ±1%
1.8 V
R24 470K ±1%
R25 100 ±1%
1.1 V
R11 10K ±1%
R13 10.5K ±1%
R14 3.3K ±1%
Q12 2SD1819AQR
R15 18K 2W
Q14 2SC4412-45
62.0 V
Q15 2SA1682-45
Q13 2SC4080DE
R16 390 ±1%
C15 560P
C12# 0.47 16V
R17# 100 ±1%
Q16 UN11004
R23 1M
C13 0.1
52.0 V
D13 MA174
C17 0.1 250V
C352 10 100V
R386 10K 3W
R350 33 1/4W
Q383 2SD1264P
D351 MA111
D352 MA111
R353 10 1/2W
R354 10 1/2W
C353 0.47 100V
T351 TLHG010
Q384 2SB940P
R355 27 2W
R380 1K 1/4W
Q382 HBF422
Q381 2SA1576A
R384 2.87K ±1%
R385 120 1/8W
R381 2.05K ±1%
R382 69.8K ±1%
C370 360P
C372 8P
C369 47 50V
R383# 1/8W
R371 360K 1/2W
TP5
DAF
R375 4.7K
R390 10K
R391 4.7K
R372 4.7M 1/4W
R371 TAGA0005
Q379 HBF423
C374 10 50V
V_DAF
C371 470P 500V
D365 MA199
R387 3K 1/8W
C373 10 50V
R392 10K
Q380 2SC4002
C379#
R374 1.78K ±1% 1/8W
R373 68K 1/8W
R389 10K 1/8W
+120V
+79.5V_DAF
-200V
440Vp-p
280Vp-p
2.3Vp-p
9.9V0-p
2.3Vp-p
5.8V0-p
-200V0-p
-3Vp-p
50Vp-p
14Vp-p
50Vp-p
TNPH0205 ⚠
PICK UP PCB
N12 TSXX027
N861
Sense Capacitor
TNPA1083Z ⚠
N11
to RADIATOR

TROUBLE SHOOTING HINTS

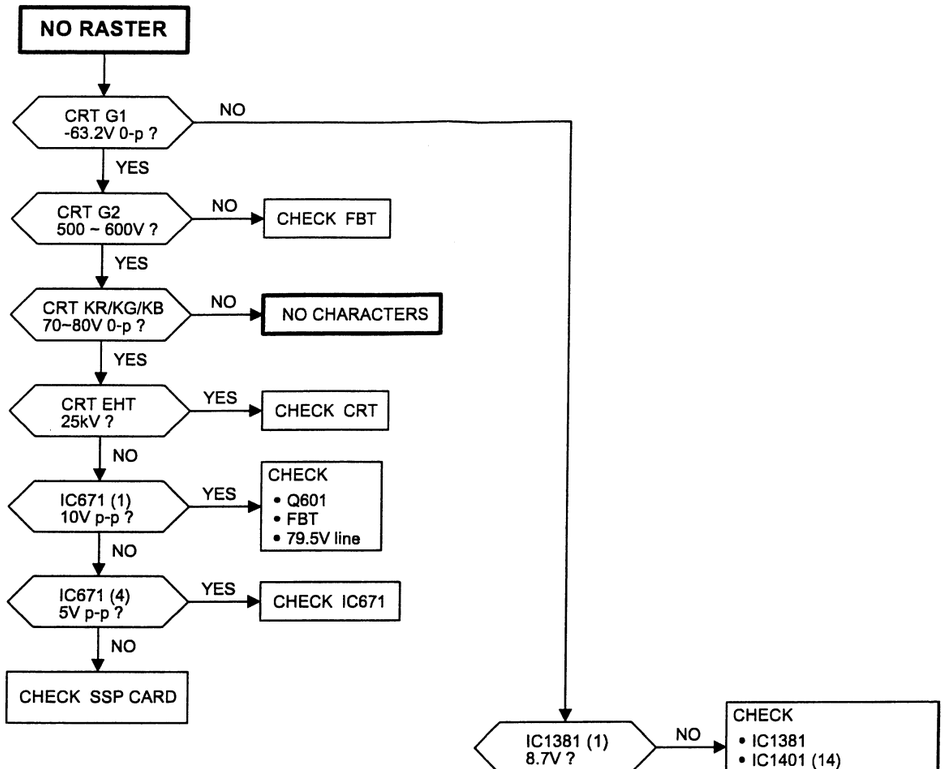


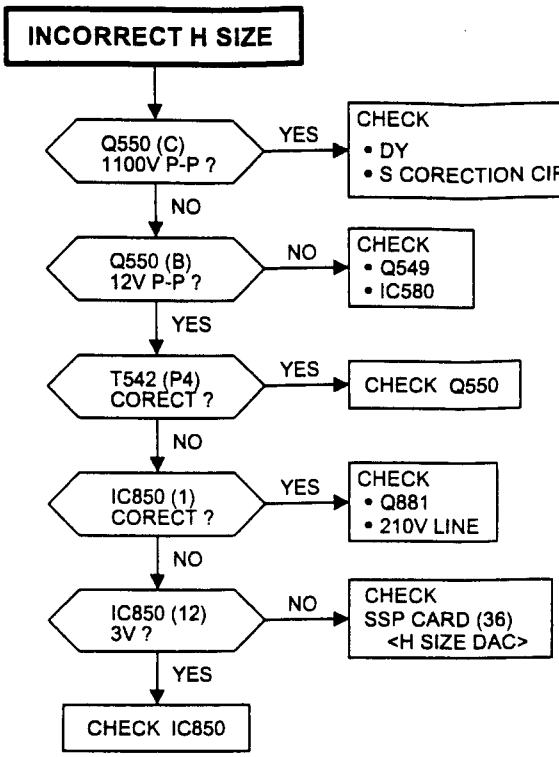




T823 (8) and IC841 (D) Voltage

AC 100V IN	121V
AC 120V IN	149V
AC 220V IN	275V
AC 240V IN	309V

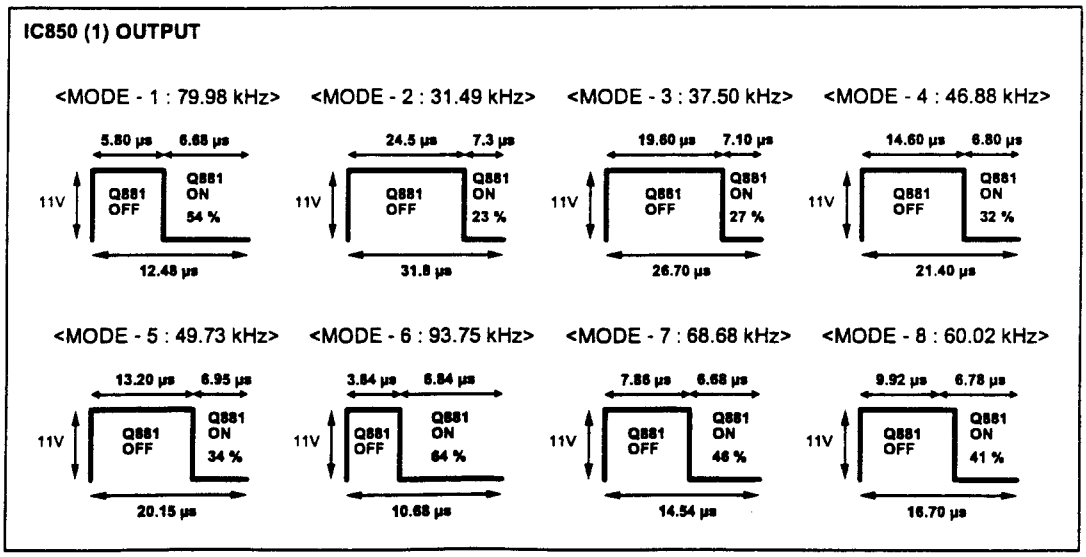




Voltage of T542 (P4)

	f H	Value
MODE - 1	79.98 kHz	119.7V
MODE - 2	31.49 kHz	47.2V
MODE - 3	37.50 kHz	57.7V
MODE - 4	46.88 kHz	69.7V
MODE - 5	49.73 kHz	76.0V
MODE - 6	93.75 kHz	142.1V
MODE - 7	68.68 kHz	100.3V
MODE - 8	60.02 kHz	87.9V

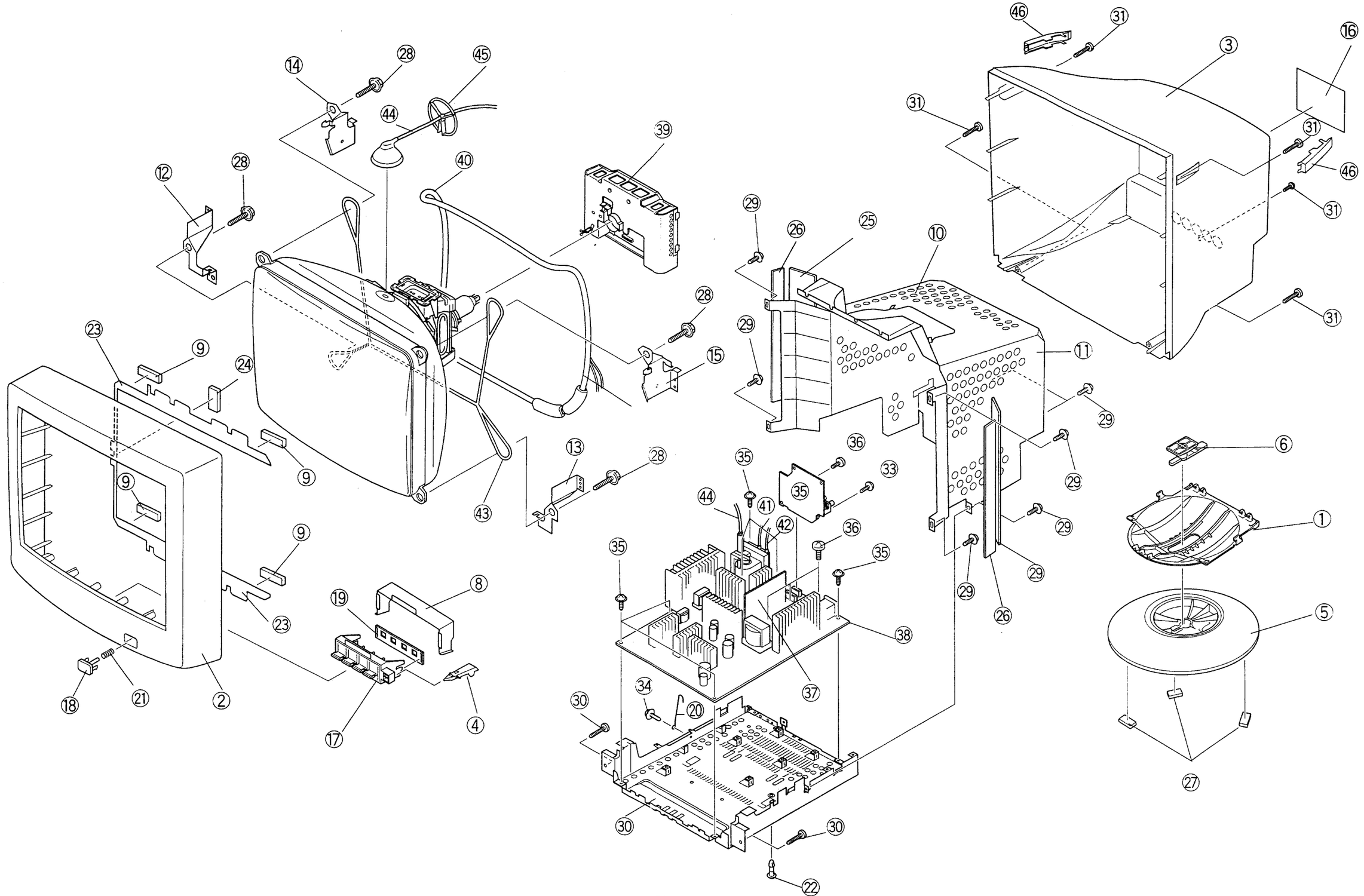
IC850 (1) OUTPUT



C_SEL_1 / C_SEL_2
C_SEL_3 / C_SEL_4 VOLTAGE

	f H	Q564 (B) C_SEL_1	Q562 (B) C_SEL_2	Q560 (B) C_SEL_3	Q575 (B) C_SEL_4
MODE - 1	79.98 kHz	0V	4.8V	4.8V	4.8V
MODE - 2	31.49 kHz	0V	0V	0V	0V
MODE - 3	37.50 kHz	4.8V	4.8V	4.8V	0V
MODE - 4	46.88 kHz	4.8V	0V	0V	4.8V
MODE - 5	49.73 kHz	0V	4.8V	0V	4.8V
MODE - 6	93.75 kHz	4.8V	4.8V	4.8V	4.8V
MODE - 7	68.68 kHz	4.8V	0V	4.8V	4.8V
MODE - 8	60.02 kHz	0V	0V	4.8V	4.8V

MEMO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